

Before the
Federal Communications Commission
Washington, D.C. 20554

In the Matter of)	
)	
Implementation of Section 6002(b) of the)	
Omnibus Budget Reconciliation Act of 1993)	WT Docket No. 07-71
)	(Terminated)
Annual Report and Analysis of Competitive)	
Market Conditions With Respect to Commercial)	
Mobile Services)	

TWELFTH REPORT

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By the Commission: Chairman Martin, Commissioners Tate and McDowell issuing separate statements;
Commissioner Copps approving in part, concurring in part and issuing a statement.

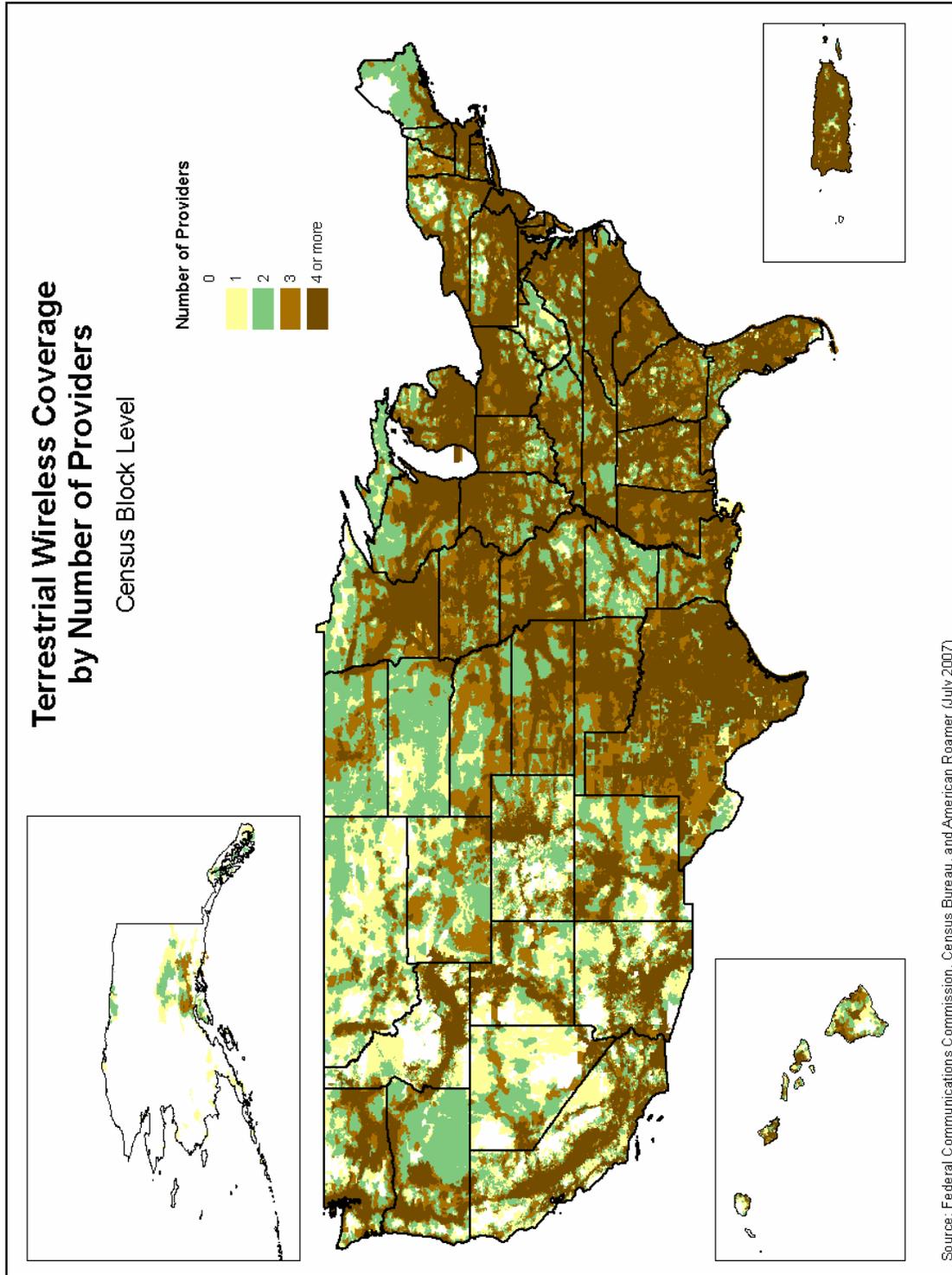
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Map 1: Mobile Telephone Competitors



I. EXECUTIVE SUMMARY

1. U.S. consumers continue to reap significant benefits – including low prices, new technologies, improved service quality, and choice among providers – from competition in the Commercial Mobile Radio Services (“CMRS”) marketplace, both terrestrial and satellite CMRS. (Unless specifically noted, discussions of mobile telephone, wireless, and CMRS services, providers, subscribers, and other metrics in the *Twelfth Report* refer to and include only terrestrial, rather than both terrestrial and satellite, services.) The metrics below indicate that there is effective competition in the CMRS market and demonstrate the increasingly significant role that wireless services play in the lives of American consumers. In particular, these metrics indicate that wireless technology is increasingly being used to provide a range of mobile broadband services.

2. The *Twelfth Report* relies on an additional data source allowing for a more granular and accurate analysis of mobile telephone service deployment and competition. This source is a set of maps available through a contract with American Roamer, which provide the detailed boundaries of the network coverage areas of every operational mobile telephone carrier in the United States. Using these maps, the Federal Communications Commission (“FCC” or “Commission”) has been able to estimate the percentage of the U.S. population covered by a certain number of providers and the percentage of the population covered by different types of network technologies, including mobile broadband technologies. The Commission is now able to base these estimates on census blocks, rather than counties. Because census blocks are much smaller than counties (there are 8 million census blocks versus 3,200 counties in the United States), this allows for a significantly more accurate and granular assessment.

Number of Providers & Network Deployment

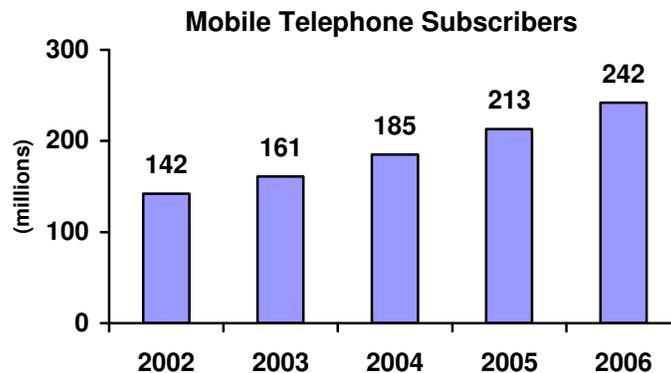
- Approximately 99.8 percent of the total U.S. population, have one or more different operators (cellular, PCS, and/or SMR) offering mobile telephone service in the census blocks in which they live.
- Approximately 99.3 percent of the U.S. population living in rural counties, or 60.6 million people, have one or more different operators offering mobile telephone service in the census blocks within the rural counties in which they live.
- More than 95 percent of the U.S. population lives in areas with at least three mobile telephone operators competing to offer service, and more than half of the population lives in areas with at least five competing operators.

Estimated Mobile Telephone Rollouts by Census Block					
Total Number of Providers in a block	Number of Blocks	POPs Contained in Those Blocks*	% of Total US POPs	Square Miles Contained in Those Blocks	% of Total US Square Miles
1 or More	8,126,003	284,743,328	99.8%	2,878,602	75.8%
2 or More	7,745,336	282,506,517	99.0%	2,327,573	61.3%
3 or More	6,732,406	272,480,505	95.5%	1,514,964	39.9%
4 or More	5,630,876	256,537,904	89.9%	931,285	24.5%
5 or More	3,579,328	162,065,639	56.8%	503,717	13.3%
6 or More	1,372,438	62,273,212	21.8%	176,124	4.6%
7 or More	233,959	10,206,476	3.6%	29,906	0.8%

*Based on Census 2000.

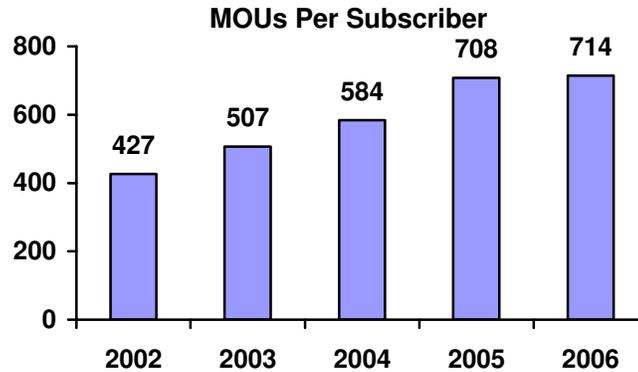
- An analysis of service provision by census block, including and excluding federal land, shows similar population coverage. By comparison, an examination of geographic coverage shows a higher percentage of geographic coverage when excluding federal lands. For example, approximately 76 percent of the total United States land area is covered by one or more providers, compared to approximately 85 percent of the land area when excluding federal land.
- Concentration in the U.S. mobile telephone market, as measured by the Herfindahl-Hirschman Index (“HHI”), declined from 2706 at the end of 2005 to 2674 at the end of 2006. No single competitor has a dominant share of the market.
- More than 150 companies identified themselves as terrestrial mobile wireless carriers in the FCC’s local competition and broadband data gathering program.
- In addition to facilities-based mobile telephone operators, the CMRS industry also includes mobile telephone resellers and Mobile Virtual Network Operators (“MVNOs”), mobile satellite service providers, and various broadband and narrowband data service providers.

Subscribers



- At the end of 2006, there were 241.8 million mobile telephone subscribers in the United States, up from 213 million at the end of 2005.
- The additional 28.8 million subscribers represent the largest absolute yearly increase in the number of subscribers ever.
- The nationwide mobile penetration rate at year end 2006 rose to approximately 80 percent of the approximately 300 million people in the United States.

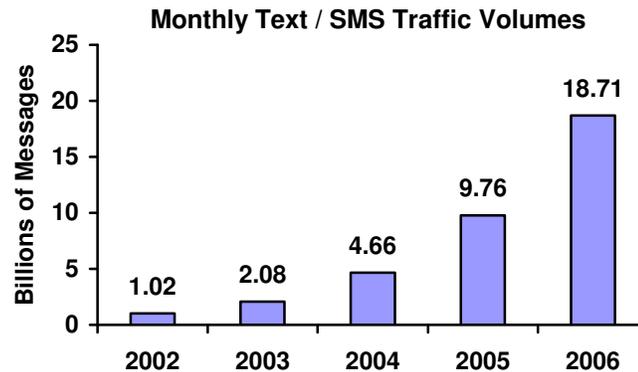
Usage



Voice:

- Average minutes-of-use per subscriber per month (“MOUs”) rose to about 714 minutes in the second half of 2006, up from 708 minutes in the same period of 2005.

Text Messaging:

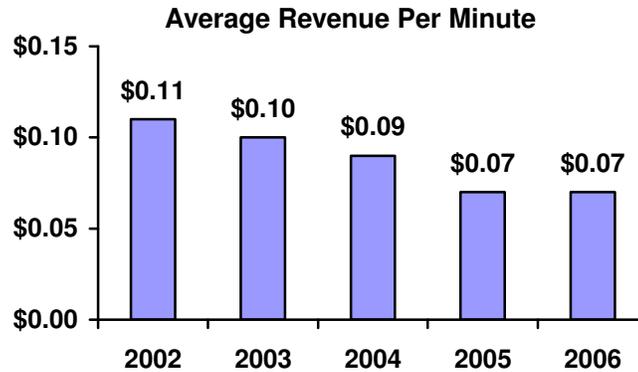


- The monthly volume of text messaging traffic grew to 18.7 billion messages during December 2006, up from 9.8 billion messages during December 2005 and the 4.7 billion messages during December 2004.

Other Data Services:

- The volume of photo messaging and other types of multimedia messaging traffic more than doubled in the past year, rising from 1.1 billion messages in 2005 to 2.7 billion messages in 2006.
- An estimated 10.7 percent of U.S. mobile telephone subscribers browsed the mobile Web for news and information in the three-month period ending May 31, 2007, up from 9.9 percent in the first quarter of 2006.

Prices



- On average U.S. mobile subscribers paid about \$0.07 per minute for mobile voice calls in December 2006 based on an estimate of average revenue per minute (“RPM”).
- After declining 85 percent from \$0.47 in December 1994 to \$0.07 in December 2005, RPM in December 2006 was unchanged from the previous year.
- The *Twelfth Report* includes an analysis “Voice RPM,” which excludes that portion of Average Revenue Per Minute (“ARPU”) generated by data services, for the first time. While overall RPM remained unchanged during 2006, voice RPM declined 5 percent.
- The percentage of the major U.S. operators’ customers who subscribe to prepaid plans rose from 13 percent at the end of 2005 to roughly 15 percent at the end of 2006.

New Technologies and Services

- During 2006 and 2007, wireless providers have continued to deploy mobile broadband networks, such as CDMA EV-DO and WCDMA/HSDPA, which allow typical downstream data transfer speeds of 400-800 kbps.
 - Approximately 82 percent of the U.S. population lives in census blocks with at least one mobile broadband provider.
 - The two nationwide CDMA operators are upgrading their EV-DO networks with EV-DO Revision A (“Rev. A”), which increases average downstream speeds to 600 kbps-1.4 Mbps and significantly improves average uplink speeds to 350-800 kbps.
 - EV-DO/EV-DO Rev. A networks cover 82 percent of the U.S. population, based on census blocks, and WCDMA/HSDPA networks cover 43 percent.
 - As of December 31, 2006, 21.9 million mobile wireless devices capable of accessing the Internet at broadband speeds were in use in the United States, versus 3.1 million at the end of 2005.
- New and innovative mobile services and devices launched during the past year include:
 - A live mobile TV service launched by Verizon Wireless using Qualcomm’s MediaFLO network.
 - The Apple iPhone, launched by AT&T in June 2007, combines the communications functions of a cellphone with the music and video features of an iPod and a web-browser that makes it easy for users to browse and navigate the entire Web.
 - Location-based services for mobile devices that rely on global positioning system

(“GPS”) technology, including search services that help shoppers locate products and businesses, and a service that enables users to track the locations of friends.

Auctions & New Entry

- In the FCC’s 2006 Advanced Wireless Services (“AWS”) auction, a new entrant acquired spectrum licenses covering approximately 275 million people, giving it a near-nationwide spectrum footprint.
- Several smaller, incumbent regional operators acquired AWS licenses that will enable them to expand their coverage and gain entry into new regional markets.
- One of the four nationwide mobile operators increased its spectrum holdings in existing markets, giving it the additional bandwidth needed to launch a mobile broadband network to compete with the broadband services offered by rival providers.
- More than half of the winning bidders in the AWS auction were designated entities, and those entities won 20 percent of all the licenses sold.
- Eighty-four megahertz of spectrum is made available in the 700 MHz band, including 62 megahertz that will be auctioned in Auction 73, scheduled to begin January 24, 2008. The remaining 22 megahertz of spectrum has already been auctioned and licensed.
- With the addition of spectrum made available in the AWS and Lower 700 MHz auctions, there are now 12 different companies that hold wireless licenses that cover more than 1 million square miles of the United States and can be used to provide CMRS. Of these, four hold spectrum licenses covering the entire land area, and thus population, of the United States, with a fifth holding spectrum licenses covering virtually the entire population of the United States.

Churn

- Most mobile telephone providers report churn rates between 1.5 percent and 3.0 percent per month.
- Approximately 10.3 million wireless subscribers ported their phone number to another wireless carrier during 2006, slightly lower than 10.6 million who ported their phone numbers during 2005.

Service Quality

- The J.D. Power and Associates 2007 Wireless Call Quality Performance Study (Volume 2), released in September 2007, found that the number of reported wireless call quality problems declined for a third consecutive reporting period, reaching the lowest levels in the five-year history of the study.
- The number of customer-reported call quality problems is 15 problems per 100 calls, down 29 percent from the same interviewing period in 2006 (21 problems per 100 calls).

International Comparisons

- The U.S. mobile penetration rate is now, for the first time, on par with those in Japan and part of Western Europe.

- U.S. mobile subscribers lead the world in average voice usage by a wide margin, with Western European subscribers averaging 150 minutes and Japanese subscribers averaging 145 minutes, compared to an average of over 700 minutes in the U.S.
- The percentage of mobile subscribers who use their cellphones for web browsing was slightly higher in the United States than in Western Europe, and there were broad similarities in the types of information accessed by American and Western European mobile subscribers.
- Mobile calls were significantly less expensive on a per minute basis in the United States than in Western Europe (where RPM averaged \$0.20 in the last quarter of 2006) and Japan (\$0.26).

Wireless-Wireline Competition

- During the second half of 2006, 11.8 percent of U.S. adults lived in households with only wireless phones, up from 7.8 percent in the second half of 2005, and triple the percentage (3.5 percent) in the second half of 2003.
- As of the same period, one in four adults aged 18-24 years lived in households with only wireless telephones, and nearly 30 percent of adults aged 25-29 years lived in wireless-only households.

Wireless-Wireline Convergence

- The past year saw the increased availability of mobile handsets with Wi-Fi data service capability, including the iPhone, T-Mobile's Dash™ and Wing™ handsets, and Sprint Nextel's Mogul™ device.
- T-Mobile and Cincinnati Bell launched dual-mode cellular-Wi-Fi handsets designed to make voice calls on cellular GSM networks and at Wi-Fi hot spots (both home and public) using voice-over-Wi-Fi technology, with seamless handoff between the two types of networks. These add-on services improve indoor coverage and allow consumers to avoid using their monthly cellular airtime minutes while at home.

Mobile Satellite Services

- At the end of 2006, there were approximately 1.1 million mobile satellite service ("MSS") subscribers in the United States, a 27 percent increase over year-end 2005.
- Currently, there are five MSS operators that provide voice and/or data service in the U.S. The voice providers include Globalstar, Inmarsat, Iridium and MSV. In addition, Orbcomm provides data-only services.
- Two other companies, ICO and TerreStar, have been authorized to provide service in the 2 GHz band. They are planning to launch satellites in late 2007 and 2008, respectively.
- MSS providers are introducing innovative pricing plans such as Globalstar's five-year unlimited monthly talking plan, starting at \$49.99 per month, decreasing to \$39.99 in year two and \$29.99 for years three through five.
- In 2003, the Commission permitted MSS licensees to provide an Ancillary Terrestrial Component ("ATC") to their satellite systems to assist their signals when not in line-of-sight. The satellite industry is optimistic about the potential positive effects of the ATC order

commenting that:

- MSS/ATC providers will offer user equipment that resembles traditional mobile consumer devices, they will be able to take better advantage of economies of scale for equipment, making it possible for them to offer high quality voice, broadband, and other services to their subscribers at prices that more closely approximate those of cellular and PCS operators.

II. INTRODUCTION

A. Background

3. In 1993, Congress created the statutory classification of Commercial Mobile Services¹ to promote the consistent regulation of mobile radio services that are similar in nature.² At the same time, Congress established the promotion of competition as a fundamental goal for CMRS policy formation and regulation. To measure progress toward this goal, Congress required the Commission to submit annual reports that analyze competitive conditions in the industry.³ This report is the twelfth of the Commission's annual reports⁴ on the state of CMRS competition.⁵ The report is retrospective, focusing

¹ Commercial Mobile Services came to be known as the Commercial Mobile Radio Services, or "CMRS." CMRS includes a large number of terrestrial services and some mobile satellite services. See 47 C.F.R. § 20.9(10).

² The Omnibus Budget Reconciliation Act of 1993, Pub. L. No. 103-66, Title VI, § 6002(b), amending the Communications Act of 1934 and codified at 47 U.S.C. § 332(c). As in the past, this report bases its analysis on a consumer-oriented view of wireless services by focusing on specific product categories, regardless of their regulatory classification. In some cases, this includes an analysis of offerings outside the umbrella of "services" specifically designated by the Commission as CMRS. However, because providers of these other services can compete with CMRS providers, the Commission believes that it is important to consider them in the analysis. As the Commission said, paraphrasing the Department of Justice/Federal Trade Commission guidelines on merger review, "When one product is a reasonable substitute for the other in the eyes of consumers, it is to be included in the relevant product market even though the products themselves are not identical." Application of Echostar Communications Corporation, General Motors Corporation, and Hughes Electronics Corporation (Transferors) and Echostar Communications Corporation (Transferee), *Hearing Designation Order*, 17 FCC Rcd 20559, 20606 (2002).

³ 47 U.S.C. § 332(c)(1)(C).

⁴ See Implementation of Section 6002(b) of the Omnibus Budget Reconciliation Act of 1993, Annual Report and Analysis of Competitive Market Conditions with Respect to Commercial Mobile Services, *First Report*, 10 FCC Rcd 8844 (1995) ("*First Report*"); Implementation of Section 6002(b) of the Omnibus Budget Reconciliation Act of 1993, Annual Report and Analysis of Competitive Market Conditions with Respect to Commercial Mobile Services, *Second Report*, 12 FCC Rcd 11266 (1997) ("*Second Report*"); Implementation of Section 6002(b) of the Omnibus Budget Reconciliation Act of 1993, Annual Report and Analysis of Competitive Market Conditions with Respect to Commercial Mobile Services, *Third Report*, 13 FCC Rcd 19746 (1998) ("*Third Report*"); Implementation of Section 6002(b) of the Omnibus Budget Reconciliation Act of 1993, Annual Report and Analysis of Competitive Market Conditions with Respect to Commercial Mobile Services, *Fourth Report*, 14 FCC Rcd 10145 (1999) ("*Fourth Report*"); Implementation of Section 6002(b) of the Omnibus Budget Reconciliation Act of 1993, Annual Report and Analysis of Competitive Market Conditions with Respect to Commercial Mobile Services, *Fifth Report*, 15 FCC Rcd 17660 (2000) ("*Fifth Report*"); Implementation of Section 6002(b) of the Omnibus Budget Reconciliation Act of 1993, Annual Report and Analysis of Competitive Market Conditions with Respect to Commercial Mobile Services, *Sixth Report*, 16 FCC Rcd 13350 (2001) ("*Sixth Report*"); Implementation of Section 6002(b) of the Omnibus Budget Reconciliation Act of 1993, Annual Report and Analysis of Competitive Market Conditions with Respect to Commercial Mobile Services, *Seventh Report*, 17 FCC Rcd 12985 (2002) ("*Seventh Report*"); Implementation of Section 6002(b) of the Omnibus Budget Reconciliation Act of 1993, Annual Report and Analysis of Competitive Market Conditions with Respect to Commercial Mobile Services, *Eighth Report*, 18 FCC Rcd 14783 (2003) ("*Eighth Report*"); Implementation of Section 6002(b) of the Omnibus Budget (continued....)

on conditions prevailing in the CMRS marketplace as of the end of the 2006 calendar year and major events in the 2007 calendar year.

4. The statute requiring the annual report on CMRS competition states,

The Commission shall review competitive market conditions with respect to commercial mobile services and shall include in its annual report an analysis of those conditions. Such analysis shall include an identification of the number of competitors in various commercial mobile services, an analysis of whether or not there is effective competition, an analysis of whether any of such competitors have a dominant share of the market for such services, and a statement of whether additional providers or classes of providers in those services would be likely to enhance competition.⁶

5. With the *Twelfth Report*, we continue to comply with each of the four statutory requirements for analyzing competitive market conditions with respect to commercial mobile services. As in previous reports, we base our analysis of competitive market conditions on a range of standard indicators commonly used for the assessment of effective competition. Since the *Ninth Report*, we have organized the presentation of the various indicators to conform to a framework that groups such indicators into four distinct categories (A) Market Structure, (B) Provider Conduct, (C) Consumer Behavior, and (D) Market Performance.⁷ This framework provides a systematic approach to addressing the four statutory requirements. For example, Section III on market structure identifies the number of competitors in various commercial mobile services, and it also uses subscriber market shares to measure concentration in mobile telephone markets. In addition, Section III tracks the entry of additional providers or classes of providers in commercial mobile services, and more generally provides an analysis of the conditions affecting the ability of additional providers or classes of providers to enter the market for commercial mobile services. As stated in earlier reports, the framework proceeds from the premise that indicators of market structure such as the number of competitors and their market shares are not, by themselves, a sufficient basis for determining whether there is effective competition, and whether any of the competitors have a dominant share of the market for commercial mobile services. Rather, we make these determinations based on an analysis of both the structural and the behavioral characteristics of the CMRS marketplace.

B. Structure of Report

6. As noted above, the structure of the *Twelfth Report* conforms to a framework that groups

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Reconciliation Act of 1993, Annual Report and Analysis of Competitive Market Conditions with Respect to Commercial Mobile Services, *Ninth Report*, 19 FCC Rcd 20597 (2004) (“*Ninth Report*”); Implementation of Section 6002(b) of the Omnibus Budget Reconciliation Act of 1993, Annual Report and Analysis of Competitive Market Conditions with Respect to Commercial Mobile Services, *Tenth Report*, 20 FCC Rcd 15908 (2005) (“*Tenth Report*”); Implementation of Section 6002(b) of the Omnibus Budget Reconciliation Act of 1993, Annual Report and Analysis of Competitive Market Conditions with Respect to Commercial Mobile Services, *Eleventh Report*, 21 FCC Rcd 10947 (2006) (“*Eleventh Report*”). The reports can also be found on the FCC’s web site at <<http://wireless.fcc.gov/cmrsreports.html>>.

⁵ This report, like the others before it, discusses CMRS as a whole because Congress called on the Commission to report on “competitive market conditions with respect to commercial mobile services.” 47 U.S.C. § 332(c)(1)(C). Any individual proceeding in which the Commission defines relevant product and geographic markets, such as an application for approval of a license transfer, may present facts pointing to narrower or broader markets than any used, suggested, or implied in this report.

⁶ 47 U.S.C. § 332 (c)(1)(C).

⁷ *Ninth Report*, at 20602-20603 and 20607.

the indicators of competitive market conditions into four distinct categories (A) Market Structure; (B) Provider Conduct; (C) Consumer Behavior; and (D) Market Performance. The final section – on market performance – evaluates the outcomes of competitive conditions in the CMRS industry from the consumer’s point of view, focusing on the benefits to consumers of competition such as lower prices, higher consumption, and better quality. In contrast, the sections on market structure, provider conduct, and consumer behavior examine the various structural and behavioral determinants of such market outcomes.

7. In using this framework to analyze competitive market conditions with respect to CMRS, we have integrated the discussion and analysis of mobile voice and mobile data services within each of the four categories of indicators. Many mobile voice operators also offer mobile data services using the same spectrum, network facilities, and customer equipment. Furthermore, many U.S. mobile providers have integrated the marketing of mobile voice and data services. For these reasons, we find it reasonable to analyze competitive conditions with respect to these services together.⁸

8. In previous reports, we also identified, and distinguished from such integrated mobile operators, mobile data providers that offer only mobile data services, instead of both voice and data services, including those providers that offer such data-only services on networks distinct from those traditionally used to provide mobile voice. Such providers were termed “data-only providers.” In this report, we have divided the providers formerly included in this category into two separate groups: broadband data providers and narrowband data providers. The first group comprises providers other than mobile telephone operators that offer portable or mobile wireless broadband Internet access and other broadband services, and the second group encompasses providers that offer messaging and other narrowband mobile data services, such as paging and telemetry services, to enterprise customers. In addition, for the first time in this report we identify a new category of service provider, called mobile video providers, which operate networks dedicated to delivering one-way, IP-based, broadcast or multicast video programming to mobile telephone customers.

9. As in previous reports, the *Twelfth Report* includes an analysis of wireless-to-wireline competition. However, since such “intermodal” competition is distinct from “intra-modal” competition among the various wireless providers, we have placed our analysis of wireless-to-wireline competition in a separate section on intermodal issues (Section VII), following the sections on market structure, provider conduct, consumer behavior and market performance within the CMRS industry. In addition to the analysis of wireless-to-wireline competition, Section VII also provides a brief discussion of Wireless Local Area Networks and Wireless-Wireline Convergence. Although both CMRS and WLAN services are wireless services, WLAN services are based on a different wireless technology and spectrum model than CMRS, and they have the potential to act as a substitute as well as a complement to data services offered over mobile telephone networks.

10. In previous reports, we integrated the discussion and analysis of the terrestrial mobile services sector and the mobile satellite services sector within each of the four categories of indicators. By contrast, in the *Twelfth Report*, we have provided a more detailed discussion and analysis of the mobile satellite services sector and placed it in a separate section (Section VIII) of the report.

III. MOBILE TELECOMMUNICATIONS MARKET STRUCTURE

11. The analysis in this section covers two distinct aspects of mobile telecommunications

⁸ Although we integrate the analysis of mobile voice and data service providers, we define separate product markets for mobile voice services and mobile data services. See Section III.A, Services and Product Market Definition, *infra*. Accordingly, our integration of the analysis of mobile voice and data services in the context of this report should not be taken as an indication that the Commission will consider mobile voice and data services as belonging in the same product market in a different context.

market structure. The first is the current level of horizontal concentration as reflected in the number of providers competing in the various mobile service markets and their respective market shares. The second is the ease or difficulty of entry into the various mobile service markets, with particular emphasis on the way spectrum allocation and availability affect entry conditions and barriers to entry.

12. As background to the discussion of horizontal concentration and entry conditions, Sections III.A and III.B provide an overview of the various types of CMRS services and service providers. Following the analysis of the current level of horizontal concentration in Section III.C, Section III.D examines recent or impending transactions that affect, or have the potential to affect, the level of horizontal concentration. Section III.E examines entry conditions and provides an overview of the different frequency bands that can be used to provide CMRS. The final section, III.F, addresses structural differences between rural and non-rural mobile telecommunications markets in the United States.

A. Services and Product Market Definition

13. Since CMRS encompasses a variety of terrestrial and satellite services, an important initial step in analyzing the structure of the mobile telecommunications market is to define the relevant product market for each of these services. The basic economic principle for defining the scope of the relevant product market is to include two mobile services in the same product market if they are essentially interchangeable from the perspective of most consumers – that is, if consumers view them as close substitutes. For the purposes of this report, relatively narrow product market definitions will be used, with a separate product market identified for each of the following services: interconnected mobile voice; mobile data; and mobile satellite service. However, the identification of separate markets for each service in the context of this report does not preclude the possibility that, in a different context, the Commission may find that two or more of these services belong in the same product market. The Commission may also find that certain types of mobile voice or data services (for example, nationwide calling plans, paging services) constitute a separate relevant product market, or that consumer demand for bundled packages of interconnected mobile voice and mobile data services make it appropriate to define one or more separate markets for bundled mobile services.

14. This report defines the mobile telephone sector to include all operators that offer commercially available, interconnected mobile voice services. These operators provide access to the public switched telephone network (“PSTN”) via mobile communication devices employing radiowave technology to transmit calls. As discussed below, providers using cellular radiotelephone, broadband Personal Communications Services (“PCS”), and Specialized Mobile Radio (“SMR”) licenses currently account for most of this sector.⁹

15. For purposes of this report, mobile data service is considered to be the delivery of non-voice information to a mobile device. This includes two-way mobile data services that involve not only the ability to receive non-voice information on an end-user device but also to send it from an end-user device to another mobile or landline device using wireless technology. The mobile data services currently available include paging, text messaging, multimedia messaging services (“MMS”) such as exchanging digital photos, information alerts, entertainment applications such as ringtones and games, video and music downloading, web browsing, email, access to files stored on corporate servers, and wireless telemetry.¹⁰

16. Any mobile satellite service (“MSS”) that involves the provision of CMRS directly to

⁹ See 47 C.F.R. §§ 22.900, 24.200, 90.601.

¹⁰ Wireless telemetry is the use of wireless technology to monitor mobile or fixed equipment in a remote location, such as the remote monitoring of utility meters by utility and energy companies. See *Eighth Report*, at 14864-14865.

end users is by statutory definition CMRS.¹¹ Current MSS applications rely on satellite connectivity to provide an array of voice and data applications, including voice telephony, Internet, two-way messaging, fax, and dispatch radio services. Satellite CMRS operators are able to provide service in many areas that are not served by terrestrial CMRS providers. As the Satellite Industry Association (“SIA”) commented, “MSS carriers [...] provide] what is often the only means by which customers in rural and remote areas can obtain voice, broadband, and other wireless services.”¹² While terrestrial and satellite CMRS operators provide wireless mobile voice and data connectivity, the *Satellite Flexibility Order* noted in 2003 that, since terrestrial CMRS and MSS are expected to have different prices, coverage, product acceptance and distribution, the two services appear, at best, to be imperfect substitutes for one another that would be operating in predominately different market segments.¹³

17. In addition, the Commission permits MSS providers in the L-band, Big LEO, and 2 GHz frequency bands to provide an ancillary terrestrial component (“ATC”) to their satellite systems, provided that the MSS operator: (1) has launched and operates its own satellite facilities; (2) provides substantial satellite service to the public; (3) provides integrated ATC; (4) observes existing satellite geographic coverage requirements; and (5) limits ATC operations only to the authorized satellite footprint.¹⁴ The Commission has granted two applications to add ATC to MSS satellite offerings, to Mobile Satellite Ventures (“MSV”) in the L-Band and to Globalstar in the Big LEO frequency bands.¹⁵ The satellite industry is optimistic about the potential positive effects of the ATC Order. Comments filed jointly by five satellite companies stated that “[o]nce deployed, MSS/ATC systems will dramatically enhance MSS carriers’ service offerings and expand their customer base.”¹⁶ In addition, the commenters stated that “...some MSS/ATC operators will be able to offer smaller, less expensive handsets comparable to those offered by terrestrial providers.”¹⁷

B. Overview of Service Providers

1. Facilities-Based Mobile Telephone Providers

18. As of year-end 2006, there were four mobile telephone operators in the United States that analysts typically describe as “nationwide”: AT&T Inc. (“AT&T”) (formerly known as Cingular

¹¹ 47 C.F.R. § 20.9(10). This rule section also contains an exception for “mobile satellite licensees and other entities that sell or lease space segment capacity, to the extent that it does not provide commercial radio service directly to end users.” The exception permits such entities to provide space segment capacity to commercial mobile radio service providers on a non-common carrier basis, if authorized by the Commission.

¹² See Comments of the Satellite Industry Association, *PN Comments*, at 3 (filed May 7, 2007) (“SIA Comments”).

¹³ See Flexibility for Delivery of Communications by Mobile Satellite Service Providers in the 2 GHz Band, the L-Band, and the 1.6/2.4 GHz bands; Review of the Spectrum Sharing Plan Among Non-Geostationary Satellite Orbit Mobile Satellite Service Systems in the 1.6/2.4 GHz Bands, *Report and Order and Notice of Proposed Rulemaking*, 18 FCC Rcd 1962, at 1984 (“*Satellite Flexibility Order*”), modified sua sponte, *Order on Reconsideration*, 18 FCC Rcd 13590 (2003), on reconsideration, *Memorandum Opinion and Order and Second Order on Reconsideration*, 20 FCC Rcd 4616 (2005), further recon pending.

¹⁴ See *Satellite Flexibility Order*, at 1964.

¹⁵ Mobile Satellite Ventures Subsidiary LLC, *Order and Authorization*, 19 FCC Rcd 22144 (Int’l Bur. 2004); Globalstar LLC, *Order and Authorization*, 21 FCC Rcd 398 (Int’l Bur. 2006).

¹⁶ See, Comments of the Mobile Satellite Service Providers (“MSS Providers”) (ICO, MSV, Inmarsat, Globalstar, TerreStar) at 7 (filed May 7, 2007).

¹⁷ See, MSS Providers Comments, at 10.

Wireless),¹⁸ Sprint Nextel Corp. (“Sprint Nextel”),¹⁹ T-Mobile USA (“T-Mobile”),²⁰ and Verizon Wireless, LLC (“Verizon Wireless”).²¹ When an operator is described as being nationwide, it does not necessarily mean that the operator’s license areas, service areas, or pricing plans cover the entire land area of the United States. The four mobile telephone carriers that analyst reports typically describe as nationwide all offer facilities-based service in at least some portion of the western, mid-western, and eastern United States. A map of the combined coverage areas of these four operators can be found in Appendix B. In addition, each of the four national operators has networks covering at least 235 million people (out of 303 million),²² while the next largest provider covers fewer than 80 million people.²³ In addition to the nationwide operators, there are a number of large regional players, including: Alltel Corp. (“Alltel”),²⁴ which covers 79 million POPs; Leap Wireless (“Leap”), which covers 48 million POPs; and United States Cellular Corp. (“US Cellular”), which covers 41 million POPs.²⁵ Moreover, many regional and smaller providers are able to offer pricing plans with nationwide coverage through roaming agreements with other providers.

¹⁸ Cingular Wireless had been a joint venture of AT&T and BellSouth Corporation (“BellSouth”). On December 29, 2006, AT&T merged with BellSouth. With the BellSouth acquisition, AT&T thereby acquired BellSouth’s 40 percent economic interest in AT&T Mobility LLC (“AT&T Mobility”), formerly Cingular Wireless LLC, resulting in 100 percent ownership of AT&T Mobility. In 2007, AT&T began rebranding its wireless operations from Cingular to AT&T. AT&T, Inc., SEC Form 10-K, Feb. 26, 2007, at 1.

¹⁹ Sprint Nextel was created by the merger of Sprint Corp. (“Sprint”) and Nextel Communications, Inc. (“Nextel”). See *Tenth Report*, at 15931.

²⁰ T-Mobile USA is a wholly-owned subsidiary of Deutsche Telekom AG (“Deutsche Telekom”).

²¹ Verizon Wireless is a joint venture of Verizon Communications, Inc. (“Verizon”) and Vodafone Group PLC (“Vodafone”). Verizon owns 55 percent of Verizon Wireless, and Vodafone owns 45 percent. See Verizon Communications, Inc., SEC Form 10-K, Mar. 14, 2006, at 11.

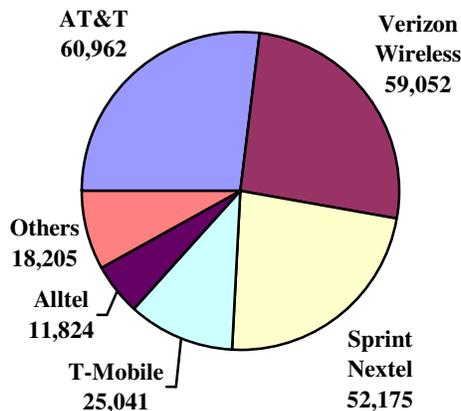
²² As a general matter, we use the most recent relevant data available. For purposes of calculating numbers on broader geographic bases, such as nationally and for Economic Areas, we use U.S. Census Bureau estimates as of July 1, 2006. See note 525. For purposes of calculating the extent of service provision using census blocks, we use 2000 Census population figures because that is the Census Bureau’s most recent data about population at the census block level.

²³ John C. Hodulik, *et al.*, *Wireless 411*, UBS Warburg, Equity Research, Mar. 19, 2007, at 20 (“4Q06 Wireless 411”).

²⁴ Due to its sizeable customer base and extensive geographic (but limited population) coverage, some analysts refer to Alltel as a “super-regional.” Ric Prentis and Eric Mallis, *Leap Wireless International*, Raymond James, Equity Research, Apr. 3, 2006, at 23 (“Alltel is a super-regional operator given its large customer base and geographical footprint, but it does not have enough licenses in Top 50 markets to be considered a national operator”). In addition, Alltel has a very low roaming rate with Verizon Wireless which allows it to offer customers attractive national rate plans. Phil Cusick and Richard Choe, *Wireless 101: A U.S. Wireless Industry Primer*, Bear Stearns, Equity Research, June 2005, at 60. One analyst reports that “Alltel believes customers view their business as ‘national’ because of their national roaming agreement with Verizon.” Simon Flannery and Jessica Yau, *Alltel Corporation, Conference Takeaways: On Track with Western Deal*, Morgan Stanley, Equity Research, May 5, 2005, at 1.

²⁵ Number of covered pops from *4Q06 Wireless 411*, at 20.

Chart 1: YE2006 Mobile Telephone Subscribers by Company
(in thousands, not representative of market share in any particular market)²⁶



19. Because the four nationwide mobile telephone operators, as well as the large regional and numerous other smaller operators, have different geographic footprints, they do not all compete head-to-head in each and every region and locality of the country. As a result, we define the scope of geographic markets on a regional or local basis. For example, Section III.C.1 below identifies the number of mobile telephone competitors on both a census block and county-by-county basis.

20. Facilities-based mobile telephone providers currently offer circuit-switched commercial mobile voice services that are interconnected with the PSTN. In addition, many of these providers offer a range of mobile data services and applications, as described in Section IV.B.6, Mobile Data Services and Applications, *infra*. Some of these services and applications connect to the PSTN, while many rely on IP-based, packet-switched networks. Furthermore, the broadband data, narrowband data, and mobile video providers described below offer additional mobile data services and applications, some of which compete with and some of which complement those offered by mobile telephone operators.

2. Resale/MVNO Providers

21. Resellers purchase airtime from facilities-based providers and resell service to the public for profit.²⁷ Many resellers today are often referred to as MVNOs (Mobile Virtual Network Operators). One commenter argued that “[MVNOs] present even more competition to traditional facilities-based

²⁶ Companies with publicly-available subscriber counts. See Appendix A, Table A-4: Top 20 Mobile Telephone Operators by Subscribers.. Total subscribers based on Table A-4.

²⁷ Interconnection and Resale Obligations Pertaining to Commercial Mobile Radio Services, *First Report and Order*, 11 FCC Rcd 18455, 18457 (1996). See, also, Implementation of the Commercial Spectrum Enhancement Act and Modernization of the Commission’s Competitive Bidding Rules and Procedures, *Second Report and Order and Second Further Notice of Proposed Rule Making*, 21 FCC Rcd 4753 (2006) (“*Designated Entity Second Report*”); *Order on Reconsideration of the Second Report and Order*, 21 FCC Rcd 6703 (2006) (“*Designated Entity Order on Reconsideration*”) (The Commission recently adopted rules to limit the award of designated entity benefits to any applicant or licensee that has “impermissible material relationships” or an “attributable material relationship” created by certain agreements with one or more other entities for the lease or resale (including under a wholesale arrangement) of its spectrum capacity.).

carriers. MVNOs target niche markets by packaging resold airtime with demographic-specific content and features. . . . MVNOs distinguish themselves via content, but like facilities-based providers, they experiment with a number of business models, such as pre-paid and unlimited plans, some even provide ways for customers to support their favorite charity through monthly usage while receiving information about the cause.”²⁸ According to information provided to the FCC in its ongoing local competition and broadband data gathering program, the resale sector accounted for 7 percent of all mobile telephone subscribers, or 15 million subscribers, at the end of June 2006.²⁹ Similarly, one analyst estimated that there were 15.1 million wireless subscribers receiving service from a resale provider at the end of 2006, up from 13.4 million customers at the end of 2005.³⁰

22. One analyst estimated that there were more than 50 MVNOs operating in 2006.³¹ TracFone Wireless Inc., which serves more than 8 million customers with prepaid offerings,³² is the largest, independent³³ reseller of wireless service. Virgin Mobile USA (“Virgin Mobile”), a joint venture between Sprint Nextel and Richard Branson’s Virgin Group, LLC, which targets its prepaid offerings at the youth market, now serves almost 4.6 million subscribers.³⁴ Other MVNOs include: Airlink Mobile, AirVoice Wireless, Azteca Mobile, Beyond Wireless / Cbeyond, DEXA Wireless, Excel Wireless, Firefly Mobile, GSR Mobile, Helio, kajeet, Jitterbug, Liberty Wireless, Movida, Omni Prepaid, PowerNet Mobile, Primus Mobile, Qwest, STI Mobile, TuYo Mobile, Working Assets Wireless, 7-Eleven Speak Out, and 9278 Mobile.³⁵ As discussed above, many of these companies are targeting specific demographic groups – such as specific age groups (kajeet, Virgin Mobile, Jitterbug) and certain ethnicities (Movida, Azteca Mobile).³⁶

23. Other groups are targeting “micro-niches.” One company, Sonopia Corp. (“Sonopia”), has helped nearly 900 organizations to create their own service, with relevant features, news, and content for members of their respective groups.³⁷ The company helps each organization design custom phones based on existing handset models from major manufacturers, and it helps the groups lease network access

²⁸ CTIA-The Wireless Association, *Comments*, at 14 (filed May 7, 2007) (“*CTIA 2007 NOI Comments*”).

²⁹ See Appendix A, Table A-2, *infra*. Number of resale subscribers calculated from information in table.

³⁰ *4Q06 Wireless 411*, at 3; *Eleventh Report*, at 10960.

³¹ Jeff Smith, *You-ser Friendly: Small Providers Personalize Cell-Phone Market*, ROCKY MOUNTAIN NEWS, Mar. 12, 2007 (citing the Yankee Group).

³² TracFone Wireless, *Comments*, at 2 (filed May 7, 2007)(“*TracFone Wireless 2007 NOI Comments*”).

³³ That is, without an equity interest from a facilities-based wireless carrier.

³⁴ Virgin Mobile, SEC Form S-1 (filed Jun. 18, 2007), at 1. Sprint Nextel also targets the teenage market through a subsidiary with its iDEN-based push-to-talk product, using an alternative prepaid brand, “Boost Mobile.” See *Ninth Report*, at 20615, for more history on the venture. Boost Mobile had 4 million customers at the end of 2006. Sprint Nextel, *Investor Quarterly Update: Fourth Quarter 2006 Results*, News Release, Feb. 28, 2007.

³⁵ *CTIA 2007 NOI Comments*, at 13 (referencing Thomas Winter Aabo, US MOBILE VIRTUAL NETWORK OPERATORS 2007: THE DEFINITIVE GUIDE AND CRITICAL ANALYSIS OF THE US MVNO MARKET, Mind Commerce (March 2007)); Jason Armstrong, et al., *MVNOs---The Story So Far*, Americas Telecom Weekly, Goldman Sachs, Equity Research, Sept. 8, 2006, at 1-2.

³⁶ *Id.*; Derek Baine, *Sprint Expands Hispanic Presence*, KAGAN WIRELESS TELECOM INVESTOR, at 5; Kim Hart, *From Three Dads, a Kid-Oriented Cellphone Service*, THE WASHINGTON POST, Apr. 2, 2007, at D02.

³⁷ Amol Sharma, *Now Everybody Can Be a Cellphone Company*, WALL STREET JOURNAL, May 7, 2007, at B1.

to carry phone calls and data.³⁸ Sonopia also manages monthly billing and customer service, though each organization's name is what appears on the customers' bill.³⁹ Many micro-niche MVNOs, such as Cancer Survivors Mobile (support for those affected by the disease) and Long Island Ducks (for fans of the minor league baseball team) are not looking to make large profits; instead, most of the groups use the service as a self-sustaining way to promote themselves or their causes and keep members or customers engaged.⁴⁰

24. Certain MVNOs have been unsuccessful in competing in the CMRS industry over the past year. Mobile ESPN, an MVNO focused on sports content, shut down less than a year after its start due to its lack of success in attracting customers.⁴¹ Amp'd Mobile, with around 200,000 subscribers, ceased operations in July 2007 after filing for Chapter 11 bankruptcy protection in June 2006 and failing to raise additional funding in time to meet debt payments.⁴² In September 2007, Disney Mobile announced it was shutting down and will cease wireless operations effective December 31, 2007.⁴³ According to Steve Wadsworth, Walt Disney Internet Group president, "The MVNO model has proven, as we've seen with other companies this past year, to be a difficult proposition in the hyper-competitive U.S. mobile phone market."⁴⁴

3. Broadband Data Providers

25. In addition to the voice and data services offered by mobile telephone providers, other providers offer or plan to offer mobile or portable wireless broadband services using Broadband Radio Service/Educational Broadband Service ("BRS/EBS") or Wireless Communications Systems ("WCS") spectrum.

26. Clearwire Corporation ("Clearwire") offers portable wireless high-speed Internet access and Voice-over-Internet Protocol ("VoIP") services to consumers using spectrum in the 2.5 GHz BRS/EBS band. As of June 2007, the company had launched broadband service in 39 markets, mainly smaller towns and cities, covering approximately 10 million people in portions of 13 U.S. states.⁴⁵ In addition, several small wireless broadband providers use BRS/EBS spectrum licenses to offer fixed or portable wireless broadband services. These providers include, for example, Solo Direct Connect in Quad-Cities, IA; Plateau Telecommunications in New Mexico and Texas; Info-Link.net in west central Minnesota; Evertex in Iowa; SpeedNet in Michigan; Gryphon Wireless in Kearny, NE; W.A.T.C.H. TV in Lima, OH; BeamSpeed in Yuma, AZ; and Digital Bridge Communications in Rexburg, ID. AT&T is using its 2.3 GHz WCS spectrum licenses to offer fixed wireless broadband Internet access service in

³⁸ *Id.*

³⁹ *Id.*

⁴⁰ *Id.*

⁴¹ Tim Horan, *Daily Datatimes*, CIBC WORLD MARKETS, Sept. 29, 2006.

⁴² Li Yuan, *Amp'd Mobile Files Chapter 11*, WALL STREET JOURNAL, June 4, 2007, at A8; Eric Zeman, *It's Over. Amp'd To Sell Assets, Cease Operations*, INFORMATIONWEEK, Jul. 23, 2007.

⁴³ Merissa Marr, *Disney Will Shut Down Cellphone Service*, WALL STREET JOURNAL, Sept. 28, 2007; Disney Mobile (visited Oct. 1, 2007) <<http://disneymobile.go.com/home/homepage.html>>.

⁴⁴ COMMUNICATIONS DAILY, Oct. 1, 2007, at 11.

⁴⁵ *Richmond First in Virginia to Experience Clearwire Wireless Broadband Service*, News Release, Clearwire, June 5, 2007. See Section IV.B.1.e, Background on Network Design and Technology Broadband Data Networks and Technology Deployment, *infra*, for a more detailed discussion of Clearwire's service and technology.

eight U.S. markets, including Juneau, AK.⁴⁶

4. Mobile Video Providers

27. Certain wireless licensees have been developing and launching networks dedicated to delivering one-way, IP-based, broadcast or multicast video programming to mobile telephone customers. Because these networks are unidirectional (downlink only), the video services are sold to end users through mobile telephone operators and rely on the mobile telephone operators' networks for any uplink communications. In addition, as currently offered, subscribers must use a device that is compatible with the mobile television network in order to receive programming.

28. Qualcomm Incorporated ("Qualcomm")'s MediaFLO service uses Lower 700 MHz spectrum and video multicasting technology to provide linear video programming, in which the same program content being aired on cable and broadcast television networks is aired on the mobile video network, as well as programming from channels exclusive to MediaFLO.⁴⁷ Verizon Wireless began offering the MediaFLO video service in 33 cities during the first half of 2007, branded as V CAST MobileTV.⁴⁸ Eight television channels are available with the service, including NBC2Go, NBCNews2Go, CBSMobile, Comedy Central, ESPN MobileTV, FoxMobile, MTV, and Nickelodeon.⁴⁹ Verizon Wireless plans to expand V CAST MobileTV to 120 cities by the end of 2007.⁵⁰ In October 2007, AT&T announced that it plans to offer the MediaFLO service to its customers in early 2008.⁵¹

29. Crown Castle International ("Crown Castle") has been running trials of a mobile television service through its Modeo subsidiary. After testing the service in Pittsburgh, Pennsylvania for three years, Modeo began offering a beta trial of its mobile television service in January 2007 for 138 users in New York City.⁵² Modeo's service uses the DVB-H (Digital Video Broadcast – Handset) mobile video technology standard and Crown Castle's spectrum license in the 1670-1675 MHz band.⁵³ The service allows subscribers to access linear television programming from six channels, including Fox

⁴⁶ *AT&T Alascom Delivers New Broadband Internet Choice for Juneau*, News Release, AT&T, Aug. 6, 2007; Kelly Hill, *Big Players Have Big Plans for WiMAX*, RCR WIRELESS NEWS, Oct. 24, 2007 (citing AT&T spokeswoman Jenny Parker). The company has conducted trials or limited deployments of WiMAX or other fixed wireless broadband technologies in a total of 22 markets. *Id.* See also, Section IV.B.1.e, Broadband Data Networks and Technology Deployment, *infra*.

⁴⁷ *Verizon Wireless Lifts Curtain on V CAST Mobile TV; True Broadcast Quality, the Best of TV*, News Release, Verizon Wireless, Jan. 7, 2007. The linear programming available on MediaFLO will have a slight delay and in some cases different commercials from the programming being aired on the television networks.

⁴⁸ Verizon Wireless, *V-Cast MobileTV* (visited July 16, 2007) <<http://www.verizonwireless.com/mobiletv>>.

⁴⁹ *Id.*; *Verizon Wireless and MediaFLO USA Serve Up a Summer of Sports for V CAST Mobile TV Customers*, News Release, Verizon Wireless, July 2, 2007.

⁵⁰ Marguerite Reardon, *Verizon CEO: No need for iPhone killer*, CNET NEWS, June 20, 2007.

⁵¹ Matt Kapko, *AT&T Pushes Back TV Rollout*, RCR WIRELESS NEWS, Oct. 26, 2007.

⁵² *Modeo Launches Live Mobile TV Beta Service in Nation's Largest Metro Area*, News Release, Modeo, Jan. 8, 2007; Modeo, *Modeo Update*, Presentation at NAB 2007, Apr. 17, 2007, available at http://www.modeo.com/NAB_Pres_041707.pdf.

⁵³ See Annual Assessment of the Status of Competition in the Market for the Delivery of Video Programming, MB Docket No. 05-255, *Twelfth Report*, 21 FCC Rcd 2503 at ¶ 230 (2006); Letter from Ari Q. Fitzgerald, Counsel to Crown Castle International Corp., to Marlene H. Dortch, Secretary, FCC, Attachment (Presentation to the FCC on the Use of the 1670-1675 MHz Band) at 3 (Sept. 28, 2006).

News, CNBC, and The Discovery Channel.⁵⁴ In July 2007, Crown Castle announced that it was transferring its Modeo subsidiary to a venture formed by Telcom Ventures, LLC and Columbia Capital, LLC.⁵⁵ The new venture will run the Modeo service and manage its assets, and Crown Castle will act as a preferred provider of tower infrastructure. Crown Castle also announced in July 2007 that it had entered into a long-term agreement to lease all of the spectrum from its 1670-1675 MHz license, which is used to provide the Modeo service, to this new venture.⁵⁶

30. Aloha Partners, L.P. (“Aloha”), a major holder of spectrum in the lower 700 MHz band, had also been conducting trials of a mobile television service, HiWire, based on DVB-H technology.⁵⁷ However, in October 2007, Aloha announced that it plans to sell its 700 MHz spectrum licenses to AT&T for \$2.5 billion.⁵⁸

5. Narrowband Data Providers

31. Several wireless data providers offer messaging and other narrowband mobile data services to enterprise customers using paging and narrowband PCS networks and spectrum. For instance, USA Mobility is the largest U.S. paging company and offers traditional paging and two-way messaging, among other wireless services, to enterprise customers.⁵⁹ In addition, Space Data Corp (“Space Data”) provides commercial telemetry services across the south-central United States to energy and other industrial companies.⁶⁰

6. Mobile Satellite Providers

32. As discussed in detail in Section VIII of this report, the commercial MSS industry in the United States is currently comprised of five service providers operating in MSS-designated frequency bands, with satellite platforms of differing orbital configurations, and offering multiple products including voice and data services in fixed and mobile environments to a variety of terminal types. The five MSS providers are Globalstar, Inmarsat plc (“Inmarsat”), Iridium Satellite LLC (“Iridium”), MSV, and Orbcomm Inc. (“Orbcomm”).

C. Horizontal Concentration

33. The level of market concentration generally depends on both the number of competing

⁵⁴ *Modeo Launches Live Mobile TV Beta Service in Nation’s Largest Metro Area*, News Release, Modeo, Jan. 8, 2007; Modeo, *Modeo Update*, Presentation at NAB 2007, Apr. 17, 2007, available at http://www.modeo.com/NAB_Pres_041707.pdf.

⁵⁵ *Crown Castle Announces Long-Term Modeo Spectrum Lease*, News Release, Crown Castle, July 23, 2007; *Crown Castle International Reports Second Quarter 2007 Results and Increases Full Year 2007 Outlook*, News Release, Crown Castle, July 31, 2007.

⁵⁶ *Crown Castle Announces Long-Term Modeo Spectrum Lease*, News Release, Crown Castle, July 23, 2007; ULS Lease ID L000002305; ULS Application File No. 0003108073. Horizon Wi-Com also holds an interest in the entity leasing the 1670-1675 MHz spectrum. See ULS Lease ID L000002305.

⁵⁷ *Modeo Tests Live Cellular TV Service in New York City*, AP, Jan. 9, 2007; Joni Morse, *Modeo Flips on Live TV in NYC*, WIRELESS WEEK, Jan. 8, 2007.

⁵⁸ Steven Russolillo and Jeffrey Bartash, *AT&T Grabs More Cellphone Spectrum*, THE WALL STREET JOURNAL, Oct. 10, 2007, at B6.

⁵⁹ USA Mobility, *Wireless Messaging – Products and Services* (visited July 11, 2007) <<http://www.usamobility.com/products/messaging/>>; *Tenth Report*, at 15923.

⁶⁰ Space Data Corp., *Overview of SkySite Network* (visited July 11, 2007) <<http://www.spacedata.net/technology.htm>>; *Tenth Report*, at 15923.

providers per market and the distribution of their respective market shares. Thus, market concentration can result from both a relatively small number of providers competing in the relevant market and a relatively high degree of inequality in the distribution of market shares among incumbent providers. In conjunction with entry conditions and the way providers and consumers behave and interact, market concentration affects the likelihood that a single provider unilaterally, or a small group of providers through coordinated action, could successfully exercise market power.

34. The basic economic principle for defining the scope of the relevant geographic market is to include customers facing the choice of similar competitive alternatives in the same geographic market. Because U.S. mobile telephone providers have different-sized geographic footprints, any individual mobile provider does not compete with all other mobile providers in each and every part of the country. This suggests that the relevant geographic market for mobile telephone services is narrower than the entire nation. An attempt to measure concentration in mobile telephone services at the national level would understate the actual level of market concentration because the underlying geographic market definition would be too broad. At the same time, defining the appropriate regional or local geographic market for mobile telephone services is a highly complex exercise due to various factors, including the relatively large number of licensed providers, the variety of geographic schemes used to license different spectrum bands, the wide variation in providers' geographic footprints, and the difficulty of collecting accurate information on the geographic coverage each mobile operator provides in its license areas. To simplify the measurement task, in this report we base our analysis of market concentration on uniform geographic areas that may be broader or narrower than the relevant geographic market. In particular, we estimate the number of competitors per market based on both census blocks and counties, and we provide concentration measures at the level of Economic Areas ("EAs").

1. Number of Mobile Telephone Competitors

a. Census Block Analysis

35. In this report, we further refine our analysis of competition in the mobile telephone sector, compared to previous reports, by compiling a list of census blocks with some level of coverage by mobile telephone providers. This analysis is performed through a contract with American Roamer, an independent consulting firm that tracks service provision for mobile voice and mobile data services.⁶¹ Under the American Roamer contract, in this report we are able to estimate the extent to which each facilities-based provider operates in the more than 8 million census blocks, compared to just the roughly 3,200 counties in previous reports.⁶² Moreover, a census block is the smallest geographic entity for which the Census Bureau tabulates decennial census data.⁶³

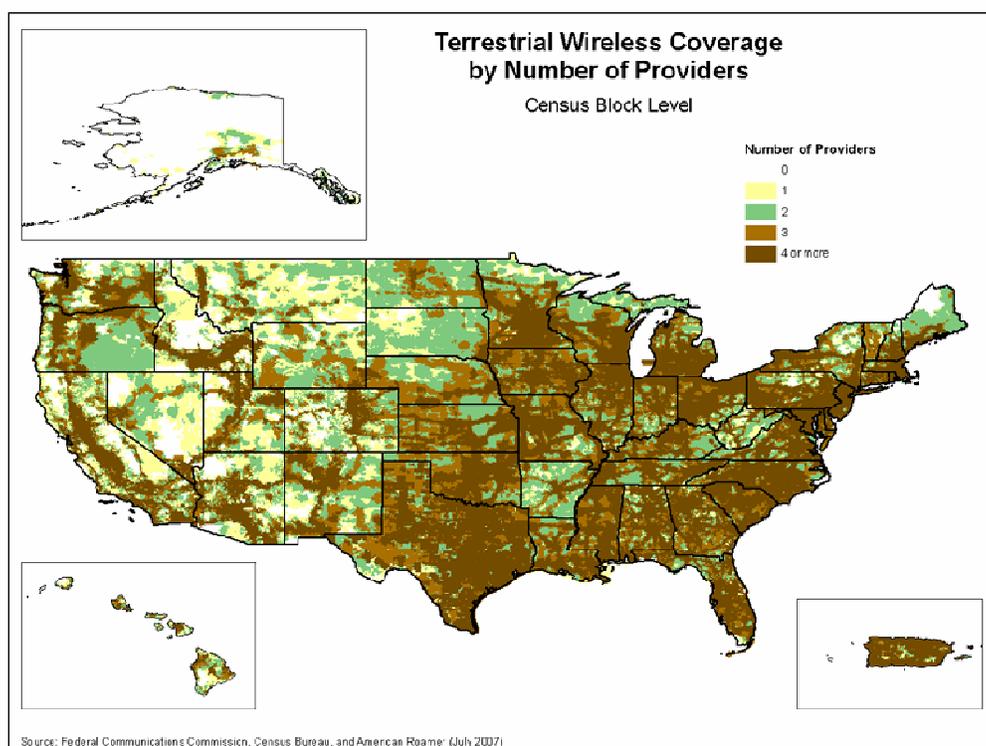
⁶¹ See www.americanroamer.com. American Roamer began in 1985 as the original vendor of custom printed roaming guides for cellular carriers, but has since evolved into a provider of data and mapping for the wireless industry in North America. American Roamer's product is unique in that it includes detailed coverage polygons of every operational terrestrial mobile telephone voice carrier in the United States, regardless of spectrum bands. In addition to public sources, American Roamer works directly with many carriers to develop its coverage maps.

⁶² There are roughly 30,000 5-digit area ZIP code areas in the United States. U.S. ZIP Code Areas 2004, Geographic Data Technology, Inc., ESRI.

⁶³ *Glossary Of Basic Geographic And Related Terms - Census 2000*, U.S. CENSUS BUREAU (visited Sept. 4, 2007) <<http://www.census.gov/geo/www/tiger/glossary.html#glossary>>. Many blocks correspond to individual city blocks bounded by streets, but blocks--especially in rural areas--may include many square miles and may have some boundaries that are not streets. The Census Bureau established blocks covering the entire nation for the first time in 1990. Previous censuses back to 1940 had blocks established only for part of the nation. Over 8 million blocks are identified for Census 2000. *Question and Answer Center*, U.S. CENSUS BUREAU (visited Sept. 4, 2007) <<http://www.census.gov/>>. The mean size of a census block is .0460 square miles, and its median size is 0.016 square miles with a range of 0.0000001 to 8,081 square miles; its mean population is 34.3 people, while its median (continued....)

36. By utilizing such a small area to analyze coverage, this method addresses the issue of the over-counting of population and geographic area inherent in a county-by-county analysis.⁶⁴ Many census blocks cover areas as small as an individual city block, and generally contain significantly fewer than 3000 people.⁶⁵ As discussed later, however, the differences in population coverage using these two methodologies are not substantial. The map below shows mobile telephone competition throughout the United States. More detailed regional maps are available in Appendix B.

Map 2: Mobile Telephone Competitors⁶⁶



37. According to our analysis of American Roamer's July 2007 coverage data of mobile telephone providers, 280 million people, or 99.8 percent of the total U.S. population, have one or more different operators (cellular, PCS, and/or digital SMR) offering mobile telephone service in the census blocks in which they live. These blocks make up 76 percent of the total land area of the United States

(Continued from previous page) _____
population is 8.0 people, with a range of 0 to 23,373 people. FCC analysis based on Census 2000 "Summary File 1 (SF 1)," available at <<http://www.census.gov/Press-Release/www/2001/sumfile1.html>>.

⁶⁴ For example, county populations can reach up to one million people, as in the county of Los Angeles.

⁶⁵ The next level above census blocks in the geographic hierarchy, census block groups - which are clusters of census blocks - generally contain between 600 and 3,000 people, with an optimum size of 1,500 people. *Appendix A: Census 2000 Geographic Terms and Concepts*, Reference Resources for Understanding Census Bureau Geography, U.S. CENSUS BUREAU (visited Jun. 22, 2007) <<http://www.census.gov/geo/www/tiger/glossry2.pdf>>, at A8.

⁶⁶ A larger version of this map may be found in Appendix B.

(including Alaska), reflecting the nation's uneven population distribution.⁶⁷ As one analyst noted: "U.S. carriers have a much more challenging environment in which to build networks. Population density is a mere 50 POPs per square mile compared to an average of 290 per mile in Europe and 370-400 per mile in major European markets like the U.K. and Germany."⁶⁸ Based on our definition of rural, roughly 61 million people, or 21 percent of the US population,⁶⁹ live in rural counties. These counties comprise 3.1 million square miles, or 86 percent of the geographic area of the U.S.⁷⁰ In sum, approximately 79 percent of the U.S. population lives on 14 percent of the land, while 21 percent live on the remaining 86 percent of the land.

38. The following table contains more detailed findings regarding population and geographic coverage.

**Table 1: Estimated Mobile Telephone Rollouts
by Census Block**

Total Number of Providers in a block	Number of Blocks	POPs Contained in Those Blocks	% of Total US POPs	Square Miles Contained in Those Blocks	% of Total US Square Miles
Total for US	8,262,363	285,230,516	100%	3,799,408	100%
1 or More	8,126,003	284,743,328	99.8%	2,878,602	75.8%
2 or More	7,745,336	282,506,517	99.0%	2,327,573	61.3%
3 or More	6,732,406	272,480,505	95.5%	1,514,964	39.9%
4 or More	5,630,876	256,537,904	89.9%	931,285	24.5%
5 or More	3,579,328	162,065,639	56.8%	503,717	13.3%
6 or More	1,372,438	62,273,212	21.8%	176,124	4.6%
7 or More	233,959	10,206,476	3.6%	29,906	0.8%

Source: Federal Communications Commission estimates based on data supplied by American Roamer, July 2007.
Notes: POPs are from the 2000 Census, and square miles include the United States and Puerto Rico.

39. As seen in the table, 273 million people, or approximately 96 percent of the total U.S. population, have three or more different operators offering mobile telephone service in the census blocks in which they live, while roughly 257 million people, or 90 percent of the U.S. population, live in census blocks with four or more mobile telephone operators competing to offer service.

40. In order to give some additional perspective on geographic coverage, we have also analyzed service provision by census block excluding lands owned or administered by the Federal Government. As the Commission has recognized, "[i]n many locations, covering certain government land may be impractical, because these lands are subject to restrictions that prevent a licensee from providing service or make provision of service extremely difficult. We also note that government lands often

⁶⁷ *Id.* Alaska is approximately 572,000 square miles (land area), while the entire United States is 3,537,000 square miles (land area). US Census Bureau, *State & County QuickFacts* (visited Nov. 7, 2007) <<http://quickfacts.census.gov/qfd/states/02000.html>>.

⁶⁸ Timothy Horan, *et al.*, *U.S. Wireless On Track To Deliver Solid Financial Results*, CIBC World Markets, Equity Research, Sept. 21, 2006, at 21.

⁶⁹ Including the populations of Puerto Rico and the Virgin Islands.

⁷⁰ Including the populations of Puerto Rico and the Virgin Islands.

include only very small portions of the population in a license area.”⁷¹ The land area of the United States is approximately 3.6 million square miles, while the area of Federal lands is approximately 1.0 million square miles, or 28 percent of the total land area of the United States. A map of showing Federal lands, with American Indian Reservations and Alaska Native Village Statistical Areas, can be found in Appendix B.

**Table 2: Estimated Mobile Telephone Rollouts Excluding Federal Land⁷²
by Census Block**

Total Number of Providers in a block	Number of Blocks	POPs Contained in Those Blocks	% of Total US POPs Excl. Those on Federal Land	Square Miles Contained in Those Blocks	% of Total US Square Miles Excl. Federal Land
Total for US	7,794,199	280,371,248	100%	2,652,534	100%
1 or More	7,712,011	279,977,515	99.9%	2,261,787	85.3%
2 or More	7,424,597	278,027,099	99.2%	1,946,674	73.4%
3 or More	6,531,770	268,649,436	95.8%	1,341,793	50.6%
4 or More	5,504,786	253,339,635	90.4%	850,768	32.1%
5 or More	3,517,710	160,199,736	57.1%	468,588	17.7%
6 or More	1,348,839	61,444,550	21.9%	164,232	6.2%
7 or More	231,031	10,042,664	3.6%	27,919	1.1%

Source: Federal Communications Commission estimates based on data supplied by American Roamer, July 2007.
Notes: POPs are from the 2000 Census, and square miles include the United States and Puerto Rico.

41. An analysis of service provision by census block, including and excluding federal land, shows similar population coverage. By comparison, an examination of geographic coverage shows a higher percentage of geographic coverage when excluding federal lands. For example, approximately 40 percent of the total United States land area is covered by three or more providers, compared to approximately 50 percent of the land area when excluding federal land. In addition, approximately 25 percent of the total United States land area has access to four or more providers compared to approximately 32 percent, when excluding federal land.

⁷¹ Service Rules for the 698-746, 747-762 and 777-792 MHz Bands, WT Docket No. 06-150, Revision of the Commission's Rules to Ensure Compatibility with Enhanced 911 Emergency Calling Systems, CC Docket No. 94-102, Section 68.4(a) of the Commission's Rules Governing Hearing Aid-Compatible Telephones, WT Docket No. 01-309, Biennial Regulatory Review -- Amendment of Parts 1, 22, 24, 27, and 90 to Streamline and Harmonize Various Rules Affecting Wireless Radio Services, WT Docket 03-264, Former Nextel Communications, Inc. Upper 700 MHz Guard Band Licenses and Revisions to Part 27 of the Commission's Rules, WT Docket No. 06-169, Implementing a Nationwide, Broadband, Interoperable Public Safety Network in the 700 MHz Band, PS Docket No. 06-229, Development of Operational, Technical and Spectrum Requirements for Meeting Federal, State and Local Public Safety Communications Requirements Through the Year 2010, WT Docket No. 96-86, *Second Report and Order*, 22 FCC Rcd 15289 (2007) ("*700 MHz Second Report and Order*"), at ¶ 160.

⁷² In this analysis, federal lands consist of lands owned or administered by the Federal Government, including the Bureau of Land Management, the Bureau of Reclamation, the U.S. Department of Agriculture Forest Service, the Department of Defense, the U.S. Fish and Wildlife Service, the National Park Service, the Tennessee Valley Authority, and other agencies. Only areas of one square mile (640 acres) or more are included. See Federal Lands of the United States, NationalAtlas.gov (visited Nov. 15, 2007) <<http://www.nationalatlas.gov/mld/fedlanp.html>><http://www.nationalatlas.gov/>.

b. County Analysis

42. In addition to the analysis of service provision by census blocks introduced in the preceding section, in this section we present the results of the Commission's analysis of service provision on a county-by-county basis used in previous reports to document long-term service provision trends. The analysis of service provision by counties is based on publicly available sources of information released by the operators such as news releases, filings with the SEC, coverage maps available on operators' Internet sites, and information filed publicly⁷³ with the Commission in proceedings or with applications.

43. The following table shows the results of our county-by-county analysis of publicly-available coverage data of mobile telephone providers.

**Table 3: Estimated Mobile Telephone Rollouts
by County**

Total Number of Providers in a County	Number of Counties	POPs Contained in Those Counties (1)	% of Total US POPs (2)	Square Miles Contained in Those Counties	% of Total US Square Miles
3 or More	2677	279,681,886	98.0%	2,470,221	68.5%
4 or More	2082	267,037,332	93.6%	1,799,560	49.9%
5 or More	1228	168,495,386	59.1%	970,078	26.9%
6 or More	443	56,978,626	20.0%	311,350	8.6%
7 or More	67	7,063,895	2.5%	41,111	1.1%

Source: Federal Communications Commission estimates based on publicly available information.

Notes: POPs are from the 2000 Census, and the square miles include the United States and Puerto Rico.

44. As of July 2007, 280 million people, or 98 percent of the total U.S. population, have three or more different operators (cellular, PCS, and/or digital SMR) offering mobile telephone service in the counties in which they live. Roughly 267 million people, or 94 percent of the U.S. population, live in counties with four or more mobile telephone operators competing to offer service.

45. As shown by the table below, these percentages are mostly unchanged from the *Eleventh Report*, with the exception of the percent of the U.S. population living in counties with five or more mobile telephone operators, which grew by 16 percent in the past year.

⁷³ This data is not based on information that is subject to a protective order.

Table 4: Market Entry Over Time

Total Number of Providers in a County	Percent of Total US POPs Covered							
	Twelfth Report	Eleventh Report	Tenth Report	Ninth Report	Eighth Report	Seventh Report	Sixth Report	Fifth Report
3 or more	98.0%	98.0%	96.9%	96.8%	94.7%	94.1%	90.8%	87.8%
4 or more	93.6%	93.8%	93.2%	93.0%	89.3%	88.7%	84.4%	79.8%
5 or more	59.1%	50.8%	87.3%	87.5%	82.6%	80.4%	75.1%	68.5%
6 or more	20.0%	17.6%	41.3%	75.8%	71.1%	53.1%	46.7%	34.6%
7 or more	2.5%	2.4%	12.6%	29.5%	25.4%	21.2%	11.9%	4.4%

Source: Federal Communications Commission estimates.

46. There are several caveats to note when considering these data. First, to be considered as covering a county, an operator need only be offering any service in a portion of that county. Second, multiple operators shown as covering the same county are not necessarily providing service to the same portion of that county. Consequently, some of the counties included in this analysis may have only a small amount of coverage from a particular provider. Third, the figures for POPs and land area in this analysis include all of the POPs and every square mile in a county considered to have coverage.⁷⁴ Therefore, this analysis overstates the total coverage in terms of both geographic areas and populations covered.

c. Census Blocks vs. Counties

47. In the table below, we compare the results of our census block and county analyses.

**Table 5: Estimated Mobile Telephone Rollouts
Counties Compared to Census Blocks**

Total Number of Providers in a County	% of Total US POPs (Counties)	% of Total US POPs (Blocks)	Absolute Difference	% of Total US Square Miles (Counties)	% of Total US Square Miles (Blocks)	Absolute Difference
3 or More	98.0%	95.5%	2.5%	68.5%	39.9%	28.6%
4 or More	93.6%	89.9%	3.7%	49.9%	24.5%	25.4%
5 or More	59.1%	56.8%	2.3%	26.9%	13.3%	13.6%
6 or More	20.0%	21.8%	1.8%	8.6%	4.6%	4.0%
7 or More	2.5%	3.6%	1.1%	1.1%	0.8%	0.3%

48. The percentage of the population covered by a given number of competitors resulting from the use of a census block analysis is similar to the figure provided by a county analysis, with the absolute difference being less than a few percentage points in all cases. However, we find that there are large differences in the percentage of the geographic area covered. While the percentage of the U.S. covered by three or more providers is about 40 percent less when measured by census blocks than when measured by counties, we note that the area covered - 1.5 million square miles - is roughly the same size as the combined land area of the 25 member countries of the expanded European Union.

⁷⁴ All population figures are based on the Bureau of the Census's 2000 county population.

2. Concentration Measures for Mobile Telephone Services

49. This section reports the results of using the Herfindahl-Hirschman Index (“HHI”) to measure market concentration with respect to the provision of mobile telephone services in EAs.⁷⁵ The value of the HHI reflects both the number of market competitors and the distribution of their market shares. In general, the value of the HHI declines as the number of firms increases and it increases with rising inequality among any given number of firms.⁷⁶

50. In principle, the market shares used to calculate HHIs can be based on various output measures, such as revenues or the number of subscribers. For reasons of data availability we have elected to calculate each mobile carrier’s market share based on the number of subscribers served by each carrier. The number of subscribers served by each carrier is determined based on the Commission’s Numbering Resource Utilization / Forecast (“NRUF”) data, which track phone number usage information for the United States.⁷⁷

51. We use EAs as the geographic unit for measuring concentration in mobile telephone markets because an EA captures the area in which the average person shops for and purchases a mobile phone, most of the time.⁷⁸ We emphasize that, in using the EA to calculate market shares for the purposes of this report, we are not concluding that the EA is the relevant geographic market for other purposes.⁷⁹

52. Based on NRUF data as of December 2006, the average value of the HHIs weighted by EA population is 2674, and the median value is about 2730.⁸⁰ This represents a decrease in average concentration from the weighted average value of 2706 and the median value of about 2785 estimated for

⁷⁵ The HHI is calculated by summing the squares of the individual market shares of all firms competing in the relevant market. When a single firm is the sole supplier in the relevant market (a pure monopoly), the HHI attains its maximum value of 10,000 (100×100). If there are ten providers, each with ten percent of the market, the value of HHI would be 1,000 [$(10)^2 \times 10$]. As the structure of a market becomes progressively more atomistic, the value of HHI approaches 0.

⁷⁶ For example, if four carriers are identified as participants in the relevant product and geographic market and each carrier accounts for 25 percent of total sales, the value of HHI would be 2500 [$(25)^2 \times 4$]. If the number of carriers increases to five, each with a 20 percent market share, the value of HHI would decline to 2000 [$(20)^2 \times 5$]. On the other hand, if there are still only four carriers but the top carrier has a 40 percent market share while each of the remaining three carriers has 20 percent, the value of HHI would increase from 2500 to 2800 [$(40)^2 + (20)^2 \times 3$].

⁷⁷ The methodology used to compile NRUF data is described in Section VI.B.4, Sub-National Penetration Rates, *infra*.

⁷⁸ See VI.B.4, Sub-National Penetration Rates, *infra*. As discussed in note 563, the use of EAs, rather than smaller geographic areas, also reduces distortions inherent in the use of NRUF data. In addition to the inherent limitations of the NRUF data detailed below, the methodology used to calculate the HHIs for EAs has its own limitations. The methodology gives equal weight to a mobile carrier that reports assigned numbers in one county as it does to a carrier that reports assigned numbers in all counties, or at least more than one county, within the EA. In effect, the methodology is based on the implicit assumption that the EA is the relevant geographic market, so that each carrier with assigned numbers in the EA is competing head to head with all other carriers operating in the EA. However, to the extent that carriers have different coverage areas that do not overlap, not all carriers with assigned numbers in an EA are in fact direct competitors. The implication is that the HHIs for EAs will tend to understate systematically the actual level of market concentration because the underlying geographic market definition is overly broad. On the other hand, there may be factors that would cause the relevant geographic market to be broader.

⁷⁹ In other contexts, such as the Commission’s review of license transfers and assignments, the relevant geographic market for calculating HHIs may be greater or less than an EA.

⁸⁰ See Appendix A, Table A-3, *infra*. The simple mean (not weighted by population) is 3046.

December 2005.⁸¹ As a benchmark for comparison, the value of HHI for a hypothetical market in which there are four carriers with equal market shares is 2500. The value of HHI for individual EAs ranges from a low of 1609 in EA 28 (covering parts of South Carolina and Georgia, including Savannah) to a high of 6551 in EA 121 (covering parts of Nebraska and Colorado). Approximately 35 percent of the population lives in EAs where the value of HHI is below the 2500 benchmark. Approximately 8.6 percent of the U.S. population lives in EAs where the value of HHI exceeds 3333, which would be the approximate value of HHI in a market that is equally divided among three competitors. However, there are four or more competitors in all but one of the EAs with HHIs in excess of 3333. This suggests that the relatively high HHI values in most of these EAs primarily reflect the limited effect of competitive entry to date in eroding the market shares of one or both carriers holding the two original cellular licenses, rather than simply a limited number of competitors.

53. In interpreting these HHIs, it is worth noting that the specific technological and economic characteristics of an industry are important determinants of the level of market concentration. Of particular importance is the relationship between economies of scale and the potential size of the market. In industries where the scale of output at which a firm can fully exploit scale economies (the minimum efficient scale) is large relative to potential demand, there will be room in the market for only a small number of firms operating at the lowest possible cost.

54. In light of the impact of technological and economic factors in determining the level of market concentration, it is noteworthy that the estimated values of HHIs for EAs tend to increase as the EA population declines. In other words, consistent with the theoretical considerations noted above, market concentration tends to be higher in EAs with a smaller potential subscriber base. For example, the EA with the highest HHI value (EA 121) is also the least populated EA. However, apart from differences in population size, EAs also vary significantly with regard to other important determinants of market demand and cost, including factors such as per capita income, population density, urbanization, the age distribution of the population, and the size and composition of the business sector.⁸² Absent a more systematic analysis of the possible relationship between these factors and market concentration, we cannot make a determination of the extent to which market concentration in any given EA is explained by potential market demand and cost factors.

3. International Comparison of Mobile Market Concentration

55. Concentration in mobile markets abroad provides another benchmark against which to evaluate U.S. mobile market concentration. This section compares the structure of mobile telephone markets in the United States and selected countries with regard to the number of market competitors and concentration measures calculated using HHIs. We note that international differences in mobile market concentration may reflect a variety of factors, including differences in the regulatory environment.

56. As noted in the *Eleventh Report*, successive wireless mergers have made the U.S. mobile market more similar in structure to comparable mobile telephone markets in Western Europe and Asia by reducing the number of national mobile operators from six to four.⁸³ There are three or four national

⁸¹ See *Eleventh Report*, at 10965.

⁸² The average cost of serving a given market tends to decline with higher population density and urbanization because high concentrations of subscribers make it easier for operators to provide adequate coverage with less infrastructure deployment. See Eugence C. Signorini, *Wireless Coverage in the United States: Leaving a Lot to Be Desired*, THE YANKEE GROUP REPORT, Vol. 1, No. 11, Aug. 2000, at 8.

⁸³ *Eleventh Report*, at 10966.

mobile telephone operators in most Western European mobile markets.⁸⁴ The United Kingdom (“UK”) is an exception with five national mobile operators.⁸⁵ Asian-Pacific countries of comparable income levels also generally have three or four national mobile operators.⁸⁶ The principal exception is Hong Kong, with five mobile operators.⁸⁷

57. Apart from the number of national competitors, there are significant structural differences between mobile markets in the United States and Western Europe. In addition to the four nationwide mobile telephone operators, several large regional operators and a large number of mobile telephone operators with smaller geographic footprints compete in many regional and local markets in the United States. In contrast, because spectrum licenses in Western Europe are generally assigned on a nationwide basis,⁸⁸ national mobile operators do not, as a rule, face competition from smaller facilities-based regional providers in Western European mobile markets. In addition, as detailed above, the number of mobile competitors per market in the United States varies by region, ranging from as many as seven or more in some counties to fewer than four competitors in other counties. Nevertheless, as previously mentioned, 98 percent of the total U.S. population lives in counties with a minimum of three different mobile operators, the same as the maximum number of national mobile providers in a number of Western European markets.

58. Because Western European regulators generally awarded nationwide licenses for second-generation GSM and third-generation services, we assume for the purposes of this report that consumers’ choices of mobile telephone operators are uniform throughout each country⁸⁹ and, accordingly, we measure concentration in European mobile markets on a national basis. For purposes of comparison, we computed HHIs based on subscriber shares as of the fourth quarter of 2006 for the following countries: Finland, France, Germany, Italy, the Netherlands, and the UK.⁹⁰ The least concentrated mobile market is in the UK, with an HHI of 2268. Mobile subscribers in the UK are relatively evenly divided among the four original GSM incumbents, and a fifth operator, a 3G start-up, increased its subscriber share to 5.5 percent by the end of 2006.⁹¹ The value of HHI in the remaining countries ranges from a low of 2999 in

⁸⁴ *Interactive Global Wireless Matrix 4Q06*, Merrill Lynch, Telecom Services Research, available at <http://www.cwes01.com/10323/24789/Interactive_Global_Wireless_Matrix.xls> (“*Interactive Global Wireless Matrix 4Q06*”).

⁸⁵ *Id.*

⁸⁶ *Interactive Global Wireless Matrix 4Q06*.

⁸⁷ *Id.* A 2006 merger between Telstra’s Hong Kong mobile subsidiary CSL and rival operator New World reduced the number of mobile operators in Hong Kong from six to five. See Sumner Lemon, *Telstra to Merge CSL With Hong Kong’s New World*, COMPUTERWORLD, Dec. 12, 2005; *Eleventh Report*, at 10967.

⁸⁸ As an exception, however, one of the third-generation spectrum licenses awarded in Finland is local. See *European Electronic Communications Regulation and Markets 2006 (12th Report)*, Commission of the European Communities, Mar. 29, 2007, at 42.

⁸⁹ In practice, available evidence indicates that network coverage varies by operator and region in European mobile markets. See, e.g., Ofcom, *The Consumer Experience*, Nov. 16, 2006, at 8 (stating that 95 percent of the UK population live within postal districts that have coverage by all four 2G mobile operators, while 99.9 percent of the UK population live within postal districts that have at least one 2G mobile operator with at least 75 percent area coverage).

⁹⁰ The subscriber shares used to calculate HHIs for European mobile markets were taken from *Interactive Global Wireless Matrix 4Q06*.

⁹¹ *Id.*

Germany to a high of 3776 in France.⁹² The relatively high values of HHI in this group of countries reflect two factors. One is the small number of competitors per market, with four national operators in Germany, the Netherlands, and Italy, and three national operators in France and Finland. Second, each market tends to be dominated by the top two competitors, which have a combined market share ranging from about 72 percent in Germany, Italy, and the Netherlands to about 82 percent in France and Finland.⁹³ In comparison, it is estimated that the combined national market share of the top two mobile telephone service providers in the United States was 51.5 percent in the last quarter of 2006.⁹⁴

59. Given our previous finding that the average value of HHI weighted by EA population in the U.S. mobile market is 2683 and that the median value is about 2730, it is evident that, on average, concentration is lower in the U.S. mobile market than in Western European mobile markets with the exception of the UK. Approximately 20 percent of the U.S. population lives in EAs where mobile market concentration is lower than in the UK. At the same time, approximately six percent of the U.S. population lives in EAs with higher mobile market concentration levels than France, the European country with the highest mobile market HHI among the European countries included in this comparison.

D. Consolidation and Exit

60. Consolidation and exit of service providers, whether through secondary market transactions or bankruptcy, may affect the structure of the mobile telecommunications market. A reduction in the number of competing service providers due to consolidation or exit may increase the market power of any given service provider, which in turn could lead to higher prices, fewer services, and/or less innovation. However, consolidation does not always result in a negative impact on consumers. Consolidation in the mobile telecommunications market may enable providers to achieve certain economies of scale and increased efficiencies compared to smaller operators.⁹⁵ If the cost savings generated by consolidation give the newly enlarged provider the ability and the incentive to compete more aggressively, consolidation could result in lower prices and new and innovative services for consumers.⁹⁶ Moreover, it is unlikely that competitive harm will result from consolidation among service

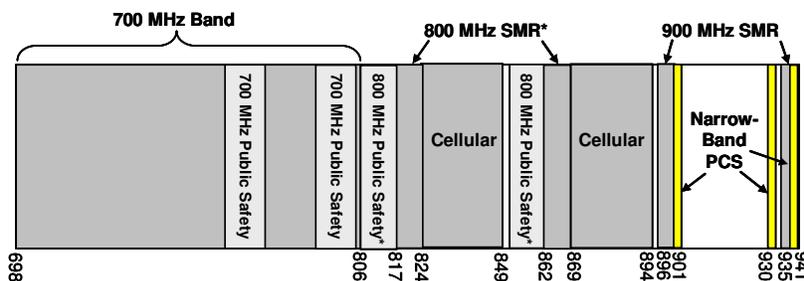
⁹² The value of HHI for the countries within this range is 3741 in Finland, 3065 in Italy, and 3441 in the Netherlands.

⁹³ *Id.*

⁹⁴ *Interactive Global Wireless Matrix 4Q06*. However, both the identity of the top two providers and their combined market share vary significantly across regional geographic markets in the United States.

⁹⁵ See Section III.C.2, Concentration Measures for Mobile Telephone Services, *supra*, and Section 0,

698-941 MHz: Narrowband PCS Spectrum



Non-Regulatory Barriers to Entry, *infra*, for a fuller discussion of how economies of scale may affect market structure.

⁹⁶ See Jonathan B. Baker, *Developments in Antitrust Economics*, JOURNAL OF ECONOMIC PERSPECTIVES, Vol. 13, No. 1, Winter 1999, at 182.

providers licensed to operate in separate geographic markets.

61. As noted previously, currently there are four nationwide facilities-based mobile telephone providers in the United States.⁹⁷ In many cases, these carriers built nationwide footprints⁹⁸ through various forms of transactions.⁹⁹ Many nationwide operators continue to seek to fill in gaps in their coverage areas, as well as to increase the capacity of their existing networks. As the Commission has previously concluded, operators with larger footprints can achieve certain economies of scale and increased efficiencies compared to operators with smaller footprints.¹⁰⁰ Since the writing of the *Eleventh Report*, a number of transactions between market participants have been completed or announced. We discuss the largest of these transactions below.

1. Sales and Swaps

62. *Alltel Acquisition by TPG Capital and GS Capital Partners* – On May 20, 2007, Alltel announced that it had signed a merger agreement to be acquired by TPG Capital and GS Capital Partners (“GSCP”), in a transaction valued at approximately \$27.5 billion.¹⁰¹ Under the terms of the merger agreement, TPG Capital and GSCP will acquire all of the outstanding common stock of Alltel for \$71.50 per share in cash.¹⁰² The purchase price per share represents a 23 percent premium over Alltel’s closing share price prior to media reports of a potential transaction published on December 29, 2006.¹⁰³ The Commission consented to the merger on October 26, 2007.¹⁰⁴

63. *Alltel / Midwest Wireless* – On October 3, 2006, Alltel completed its previously announced plan to purchase Midwest Wireless, a privately-held company, for \$1.075 billion in cash.¹⁰⁵ With the purchase, Alltel gained approximately 450,000 wireless subscribers in southern Minnesota, northern and eastern Iowa, and western Wisconsin.¹⁰⁶ According to Alltel president and CEO Scott Ford, “The addition of Midwest Wireless bolsters Alltel’s position in the wireless industry by adding CDMA properties that are contiguous to our existing markets in the Midwestern U.S.”¹⁰⁷

⁹⁷ See Section III.B.1, Facilities-Based Mobile Telephone Providers, *supra*.

⁹⁸ Generally, “footprint” is an industry term of art referring to the total geographic area in which a wireless provider offers service or is licensed to offer service.

⁹⁹ The Commission must consent to the transfer of control or assignment of all non pro-forma spectrum licenses used to provide wireless telecommunications services. 47 C.F.R. § 1.948.

¹⁰⁰ See *Seventh Report*, at 12997. One study found bigger companies get better equipment prices because of their size. Shawn Young, *As Wireless Firms Grow, So Can Costs*, WALL STREET JOURNAL, Apr. 29, 2004, at B4. However, the study also found that the cost of signing up new customers increases as wireless companies get bigger.

¹⁰¹ *Alltel to be Acquired by TPG Capital and GS Capital Partners for \$71.50 per Share*, News Release, Alltel, May 20, 2007.

¹⁰² *Id.*

¹⁰³ *Id.*

¹⁰⁴ In the Matter of Applications of ALLTEL Corporation, Transferor, and Atlantis Holdings LLC, Transferee For Consent To Transfer Control of Licenses, Leases and Authorizations, *Memorandum Opinion and Order*, 22 FCC Rcd 19517 (2007).

¹⁰⁵ *Alltel completes purchase of Midwest Wireless*, News Release, Alltel, Oct. 3, 2006. See, also, Applications of Midwest Wireless Holdings, L.L.C. and ALLTEL Communications, Inc., WT Docket No. 05-339, *Memorandum Opinion and Order*, 21 FCC Rcd 11526 (2006).

¹⁰⁶ *Alltel Completes Purchase of Midwest Wireless*, News Release, Alltel, Oct. 3, 2006.

¹⁰⁷ *Id.*

64. *AT&T / Aloha* – On October 9, 2007, AT&T announced an agreement to purchase spectrum licenses in the 700 MHz band from Aloha.¹⁰⁸ AT&T agreed to pay approximately \$2.5 billion in cash for the licenses, which consists of 12 megahertz of spectrum covering 196 million people in 281 markets.¹⁰⁹ According to the company, the spectrum covers many major metropolitan areas, including 72 of the top 100 and all of the top 10 markets in the United States.¹¹⁰

65. *AT&T / Dobson* – On June 29, 2007, AT&T announced that it would acquire Dobson Communications Corporation (“Dobson”) for approximately \$2.8 billion in cash.¹¹¹ Dobson, with 1.7 million subscribers, markets wireless service under the Cellular One brand name.¹¹² Dobson’s GSM network covers rural and suburban areas in Alaska, Arizona, Illinois, Kansas, Kentucky, Maryland, Michigan, Minnesota, Missouri, New York, Ohio, Oklahoma, Pennsylvania, Texas, Virginia, West Virginia and Wisconsin.¹¹³ Through the acquisition, AT&T expects to realize significant annual savings in reduced roaming expenses, as well as cost savings for the combined companies in areas such as overhead and operations.¹¹⁴ According to Randall L. Stephenson, chairman and CEO of AT&T, “The combination of our two companies also will create value for AT&T’s stockholders . . . [by bringing] two key assets – Dobson’s 1.7 million customers and its strong, compatible network – to AT&T, delivering both growth and cost savings opportunities.”¹¹⁵

66. *Sprint Nextel / Northern PCS* – On June 13, 2007, Sprint Nextel announced an agreement to acquire Northern PCS Services, LLC (“Northern PCS”), one of its few remaining affiliates, for \$312.5 million, including the assumption of debt.¹¹⁶ The company completed the acquisition on August 2, 2007.¹¹⁷ Northern PCS, based in Minnesota, provided Sprint PCS services in small to mid-size markets in Minnesota, North Dakota, Wisconsin and Iowa, serving more than 167,000 direct wireless subscribers and more than 69,000 reseller subscribers in a coverage area of more than 1.8 million people.¹¹⁸ It employed about 240 people and had revenues for the twelve months ended December 31, 2006 of \$130 million.¹¹⁹ With the acquisition of Northern PCS, Sprint Nextel has three remaining independent wireless affiliates: iPCS, Shentel, and Swiftel.¹²⁰

¹⁰⁸ *AT&T Acquires Wireless Spectrum from Aloha Partners*, News Release, AT&T, Oct. 9, 2007

¹⁰⁹ *Id.*

¹¹⁰ *Id.*

¹¹¹ *AT&T to Acquire Dobson Communications, Expand Wireless Coverage*, News Release, Dobson, Jun. 29, 2007.

¹¹² *Id.*

¹¹³ *Id.*

¹¹⁴ *Id.*

¹¹⁵ *Id.*

¹¹⁶ *Sprint Nextel to Acquire Affiliate Northern PCS*, News Release, Sprint Nextel, Jun. 13, 2007.

¹¹⁷ *Sprint Nextel Concludes Acquisition of Affiliate Northern PCS*, News Release, Sprint Nextel, Aug. 2, 2007.

¹¹⁸ *Sprint Nextel to Acquire Affiliate Northern PCS*, News Release, Sprint Nextel, Jun. 13, 2007.

¹¹⁹ *Id.*

¹²⁰ As of November 2004, there were 12 Sprint affiliates, including Alamosa Holdings Inc., US Unwired Inc., AirGate PCS Inc., UbiquiTel Inc., Horizon PCS Inc., Shenandoah Telecommunications Co., Enterprise Wireless, Gulf Coast Wireless, iPCS Inc, Independent Wireless One (IWO), Northern PCS, and Swiftel. Phil Cusick and Richard Choe, *Airgate PCS Inc.*, Bear Stearns, Equity Research, Nov. 24, 2004, at 19. In February 2005, Alamosa completed its acquisition of AirGate, while iPCS completed its acquisition of Horizon PCS in July. *Alamosa Closes* (continued....)

67. *T-Mobile / SunCom* – On September 17, 2007, T-Mobile and SunCom Wireless Holdings, Inc. (“SunCom”) announced that they had entered into a definitive merger agreement for the acquisition by T-Mobile of all of the outstanding shares of common stock of SunCom, for approximately \$1.6 billion in cash and another \$0.8 billion in assumed debt.¹²¹ SunCom operates a GSM/GPRS/EDGE network in North Carolina, South Carolina, Tennessee, Georgia, Puerto Rico and the U.S. Virgin Islands. The company has provided roaming service to T-Mobile in these markets since 2004.¹²² At the end of the second quarter of 2007, SunCom had more than 1.1 million customers.¹²³

68. Robert Dotson, president and chief executive officer of T-Mobile, claimed that the acquisition “will round out our domestic footprint, allowing us to serve 98 of the top 100 markets, and will significantly benefit our financial position by reducing roaming expense.”¹²⁴ According to T-Mobile, the company expects to realize synergies with a net present value of approximately \$1 billion through reduced roaming and operating expenses.¹²⁵ The company also expects further upside growth opportunities through the addition of new markets.¹²⁶

69. *Verizon Wireless / Rural Cellular* - On July 30, 2007, Verizon Wireless announced that it has entered into an agreement to acquire Rural Cellular Corporation (“Rural Cellular”) for approximately \$2.67 billion in cash and assumed debt.¹²⁷ As of March 31, 2007, Rural Cellular’s network served 716,000 customers, under the Unicel brand, in 5 regional markets (Central, Midwest, Northeast, South and Northwest) covering 15 states.¹²⁸ According to the company, the combination will increase Verizon Wireless’s coverage by 4.7 million licensed pops. Rural Cellular currently utilizes both CDMA and GSM technology separately across its markets.¹²⁹ While it plans to deploy CDMA service in Rural Cellular’s existing GSM markets and convert the GSM customers to CDMA service, Verizon Wireless anticipates maintaining the existing GSM networks to provide roaming services to other GSM providers’ customers.¹³⁰ Verizon Wireless expects to realize more than \$1 billion in cost savings through reduced roaming and operations expenses.¹³¹

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Acquisition of AirGate PCS, News Release, Alamosa, Feb. 15, 2005; *iPCS Announces Closing of Merger with Horizon PCS*, News Release, iPCS, July 1, 2005. Sprint Nextel completed its acquisition of Nextel Partners in June 2006 and of UbiquiTel in July 2006. *Sprint Nextel Completes Acquisition of Nextel Partners*, News Release, June 26, 2006; *Sprint Nextel Completes Acquisition of Wireless Affiliate UbiquiTel Inc.*, News Release, July 1, 2006. For a discussion of why Sprint Nextel has been acquiring its affiliates, see *Eleventh Report*, at 10969, note 112, as well as *Eleventh Report*, at 10970.

¹²¹ *T-Mobile Agrees to Acquire SunCom Wireless to Expand Network and Industry-Leading Customer Service to the Southeastern United States, Puerto Rico and U.S. Virgin Islands*, News Release, T-Mobile, Sept. 17, 2007.

¹²² *Id.*

¹²³ *Id.*

¹²⁴ *Id.*

¹²⁵ *Id.*

¹²⁶ *Id.*

¹²⁷ *Verizon Wireless to Acquire Rural Cellular Corporation, Expand the Nation’s Most Reliable Wireless Network*, News Release, Verizon Wireless, Jul. 30, 2007.

¹²⁸ *Id.*

¹²⁹ *Id.*

¹³⁰ *Id.*

¹³¹ *Id.*

E. Entry Conditions and Potential Barriers to Entry

70. Market concentration is necessary but not sufficient for unilateral or coordinated anti-competitive behavior to occur. If entry into a market is easy, then entry or the threat of entry may prevent incumbent operators from exercising market power, either collectively or unilaterally, even in highly concentrated markets.¹³² The ease or difficulty of entry generally depends on the nature and significance of entry barriers. Barriers to entry in the mobile telecommunications market may include government regulation of access to spectrum and various non-regulatory entry barriers such as economies of scale. In the following sections, we first address access to spectrum, and then discuss potential non-regulatory barriers to entry.

1. Spectrum Access

71. In this section we first discuss the impact of the Commission's spectrum management policies on entry conditions in the mobile telecommunications market. We then provide an analysis of the outcomes of recent auctions, highlighting the growing number of licensees with near nationwide spectrum footprints. Finally, we identify and discuss the various spectrum bands that can be used for the provision of CMRS.

a. Spectrum Policy and Entry Conditions

72. Government control of spectrum allocation and assignment has the potential to create a barrier to entry into markets for mobile communications services by limiting the amount of spectrum allocated to CMRS and by requiring providers to obtain a government-issued license in order to use such spectrum for the provision of CMRS.¹³³ However, the Commission has helped to reduce any potential entry-limiting effects of government-controlled spectrum allocation and assignment through various policies. First, as discussed in greater detail below, the Commission has progressively increased the amount of spectrum available for the provision of CMRS. For example, the allocation of 120 megahertz of spectrum to broadband PCS and the assignment of broadband PCS spectrum licenses through auction ended the cellular duopoly by facilitating the entry of new mobile telephone service providers. More recently, the auction of licenses for spectrum allocated to AWS raised the total amount of spectrum available for CMRS by an additional 90 megahertz. Moreover, the current transition of the BRS/EBS spectrum band and the upcoming auction of commercial spectrum in the 700 MHz band will further increase the amount of spectrum available for CMRS. The impact of the AWS auction, BRS/EBS transition, and 700 MHz band on spectrum-related entry barriers is analyzed in the following section.

73. Second, the Commission has progressively implemented a more flexible, market-oriented model of spectrum allocation and assignment for spectrum used to provide commercial mobile services. For example, initially spectrum policy restricted the use of cellular spectrum to analog service and created an absolute barrier to entry by limiting the number of cellular entrants to two in each local market. In contrast, as detailed below, current policy affords licensees greater flexibility to decide what services to offer and what technologies to deploy on cellular spectrum, as well as other spectrum used for the provision of CMRS, and allows market forces to play a greater role in determining the number of entrants in each local market for mobile telephone service.

74. Finally, subject to the Commission's approval, CMRS licensees are allowed to buy and

¹³² See *DOJ/FTC Guidelines* at §3.0; see also Dennis W. Carlton and Jeffrey M. Perloff, *Modern Industrial Organization* (3rd ed.), Addison, Wesley, Longman, Inc., 1999, at 77.

¹³³ See, e.g., Thomas W. Hazlett, *The Wireless Craze, The Unlimited Bandwidth Myth, The Spectrum Auction Faux Pas, and the Punchline to Ronald Coase's "Big Joke"*, Working Paper 01-01, AEI-Brookings Joint Center for Regulatory Studies, Jan. 2001; *Spectrum Framework Review: Implementation Plan*, Consultation Document, Office of Communications, Jan. 13, 2005, at 77 and 81-82.

sell licenses, in whole or in part, on the secondary market. As noted in the *Ninth Report*, beginning in 2003 the Commission also allowed CMRS licensees to lease all or a portion of their spectrum usage rights for any length of time within the license term, and over any geographic area encompassed by the license.¹³⁴ The cumulative effect of these flexible, market-oriented spectrum policies has been to help reduce any entry barriers that may arise from government regulation of spectrum.

b. Recent Spectrum Auctions

75. The results of the recent auctions indicate that the Commission's spectrum allocation and assignment policies have helped minimize spectrum-related entry barriers. In the Commission's first auction of spectrum for AWS that closed in September 2006 (Auction 66), major cable companies were able to acquire spectrum licenses needed to enter the market for wireless services. New entrant SpectrumCo LLC ("SpectrumCo"), which is owned by several cable companies,¹³⁵ acquired non-overlapping spectrum licenses covering approximately 275 million people, giving it a near-nationwide spectrum footprint.¹³⁶ As noted in a subsequent section of this report, T-Mobile, an independent nationwide provider, acquired the spectrum licenses it needs to launch a wireless broadband network.¹³⁷ In addition, a number of smaller incumbent carriers – including Leap, MetroPCS Communications, Inc. ("MetroPCS"), and Cincinnati Bell, Inc. ("Cincinnati Bell") – acquired licenses enabling them to expand the geographic coverage of their spectrum holdings significantly and thereby gain entry into new regional markets.¹³⁸ Similarly, a number of new entrants – such as Qualcomm – were able to acquire spectrum licenses in the Commission's first several auctions of spectrum licenses in the Lower 700 MHz band from 2002 to 2005 (Auctions 44, 49, and 60), and Qualcomm's spectrum acquisitions in the Lower 700 MHz band have given it a nationwide spectrum footprint.¹³⁹ A map of nationwide spectrum licensees can be found in Appendix B.

76. The demonstrated ability of new entrants to acquire nationwide or near-nationwide spectrum footprints in these auctions, as well as the ability of incumbent regional service providers to expand their spectrum footprints, undermines claims that the Commission's auction design enables the leading nationwide carriers to prevent entry of another nationwide player.¹⁴⁰ More generally, these auction outcomes support the notion that spectrum allocation and assignment policies do not create an

¹³⁴ *Ninth Report*, at 20631.

¹³⁵ The cable company owners of SpectrumCo are Comcast, Time Warner, Cox, and Bright House. Incumbent carrier Sprint Nextel also has a 5 percent ownership stake in SpectrumCo, but in August 2007 Sprint Nextel announced that it was exercising its right to withdraw from the SpectrumCo consortium. See *Sprint Nextel to Withdraw From SpectrumCo Joint Venture*, TRDAILY, Aug. 3, 2007.

¹³⁶ See Auction of Advanced Wireless Services Closes: Winning Bidders Announced for Auction 66, *Public Notice*, 21 FCC Rcd 10521 (2006). SpectrumCo did not acquire spectrum covering Alaska, Montana, North Dakota, much of South Dakota, most of Colorado, or much of western Texas.

¹³⁷ See Section IV.B.1.c, Technology Choices and Upgrades of Mobile Telephone Providers, *infra*.

¹³⁸ *Id.*

¹³⁹ Lower 700 MHz Band Auction Closes, *Public Notice*, 17 FCC Rcd 17272 (2002); Lower 700 MHz band Auction Closes, *Public Notice*, 18 FCC Rcd (2003); Auction of Lower 700 MHz Band Licenses Closes, *Public Notice*, 20 FCC Rcd 13424 (2005).

¹⁴⁰ See, e.g., Andzeg Skrzypacz and Robert Wilson, *The Design of the 700 MHz Spectrum Auction: An Opportunity to Promote Competition and Public Safety*, May 23, 2007; Peter Cramton, Andrzej Skrzypacz, and Robert Wilson, *Auction Revenues in the 700 MHz Spectrum Auction*, June 27, 2007. If nationwide, incumbent wireless service providers were intent on acquiring spectrum solely to foreclose new entry, they would not have allowed SpectrumCo LLC to acquire a near-nationwide footprint in the AWS auction.

effective barrier to entry into the U.S. mobile telecommunications market.

Table 6: Footprint Expansion as a Result of Auction 66

Carrier	New Non-Overlapping Pops Added in Auction 66
Cable Companies bidding as SpectrumCo LLC	275 million
MetroPCS (MetroPCS AWS, LLC)	82 million
Leap Wireless (Cricket Licensee (Reauction), Inc.)	76 million
T-Mobile (T-Mobile License LLC)	20 million
Dobson Communications (American Cellular Corporation)	10 million
Cincinnati Bell (Cincinnati Bell Wireless LLC)	4 million

Notes: In this analysis, Pops are based on Census estimated 2005 population counts. Census 2000 population counts were used for U.S. Island Area since 2005 estimates were not available.

Table 7: Nationwide Terrestrial Spectrum Holders¹⁴¹
Total Footprint including Results of AWS and Lower 700 MHz Auctions

Facilities-Based Nationwide Service Providers	Nationwide Spectrum Holders			
	By Population (More than 100 million licensed pops)		By Geography (More than 1 million sq. mi. licensed pops)	
AT&T	AT&T	285 million	AT&T	3.6 million
Sprint Nextel	Sprint Nextel	285 million	Sprint Nextel	3.6 million
T-Mobile	T-Mobile	285 million	T-Mobile	3.6 million
Verizon Wireless	Verizon Wireless	279 million	Verizon Wireless	2.9 million
	Aloha	171 million	Aloha	1.0 million
	Leap Wireless	176 million	Leap Wireless	2.2 million
	MetroPCS	137 million	MetroPCS	1.1 million
	Qualcomm	285 million	Qualcomm	3.6 million
	SpectrumCo	261 million	SpectrumCo	2.3 million
			Alltel	1.9 million
			Nextwave	1.6 million
		Dobson	1.0 million	

c. Spectrum Bands Potentially Available for Terrestrial CMRS

77. Currently, mobile telephone operators primarily use three types of spectrum licenses to provide mobile voice and, in most cases, mobile data services: cellular, broadband PCS, and SMR.¹⁴² Initially, the Commission authorized up to eight different mobile telephone licenses (two cellular and six broadband PCS) in every geographical area of the country.¹⁴³ In addition, there are other bands – including, 700 MHz, 1710-1755/2110-2155 MHz (AWS-1), 2500-2690 MHz (BRS/EBS), 2.3 GHz (WCS), 1670-1675 MHz, and 901-902 MHz (Narrowband PCS) – that are licensed under the Commission’s flexible Part 27 or Part 24 rules and can be used to provide CMRS services.¹⁴⁴ Under Commission rules, many licensees may disaggregate (divide the spectrum into smaller amounts of bandwidth) or partition (divide the license into smaller geographical areas) their licenses, or both, to other entities.¹⁴⁵ Many licensees hold more than one license in a particular market.¹⁴⁶ We discuss in more

¹⁴¹ FCC estimates.

¹⁴² See Appendix B, Table B-1, and Maps B-46 to B-50, *infra*, for descriptions and maps of various geographical licensing schemes employed by the Commission.

¹⁴³ As a result of partitioning and disaggregation, there often are more than eight cellular and broadband PCS licenses in a market. However, in a few areas, there may be fewer than eight active licenses because certain auction winners or licensees have defaulted on payments to the Commission, because some licensees did not meet their buildout requirements, some licensees returned their licenses, or some licenses remained unsold in an auction.

¹⁴⁴ The discussion in this report is to be distinguished from the identification of the relevant spectrum input markets in the context of the Commission’s review of individual wireless license transfers and assignments. For example, in wireless transactions, the Commission includes, in its evaluation of potential competitive harm, spectrum in particular bands that is “suitable” for the provision of services in a relevant product market, such as mobile telephony services. See Applications of AT&T Inc. and Dobson Communications Corporation, WT Docket No. 07-153, *Memorandum Opinion and Order*, FCC 07-196, at 17 ¶ 26 (rel. Nov. 19, 2007) (“[S]uitability is determined by whether the spectrum is capable of supporting mobile service given its physical properties and the state of equipment technology, whether the spectrum is licensed with a mobile allocation and corresponding service rules, and whether the spectrum is committed to another use that effectively precludes its uses for mobile telephony.”)

¹⁴⁵ 47 C.F.R. §§ 27.15.

detail below spectrum bands potentially available for terrestrial CMRS. Band plan diagrams for each spectrum band depict where the frequencies are located. Spectrum described in this section may be used for a variety of CMRS products including narrowband data services as well as mobile telephony, broadband data and mobile video services. In addition to the 643 megahertz of terrestrial spectrum described in this section, there is an additional 157.7 megahertz of mobile satellite spectrum available for CMRS voice and data services.

Table 8: Spectrum Bands Potentially Available for Terrestrial CMRS

Spectrum Band	Megahertz
Cellular	50
SMR*	14
Broadband PCS	120
1910-15/1990-95 MHz**	10
700 MHz	84
AWS-I	90
AWS – II & III***	40
BRS/EBS****	194
WCS	30
1670-1675 MHz	5
Narrowband Spectrum	6
Total	643

* Post 800 MHz Band Reconfiguration ESMR spectrum at 817-824 MHz and 862-869 MHz.

** Held by Sprint Nextel as a result of the 800 MHz Band Reconfiguration.

*** These bands have been designated for AWS.

**** BRS/EBS spectrum is calculated based on the post-transition band plan described in 47 C.F.R. §27.5(i)(2). EBS licenses must be held by educational institutions; however, EBS licensees can lease a significant portion of their spectrum to commercial operators.

(i) Cellular

78. The Commission began licensing commercial cellular providers in 1982 and completed licensing the majority of operators by 1991. The Commission divided the United States and its possessions into 734 cellular market areas (“CMAs”), including 305 Metropolitan Statistical Areas (“MSAs”), 428 Rural Service Areas (“RSAs”), and a market for the Gulf of Mexico.¹⁴⁷ Two cellular

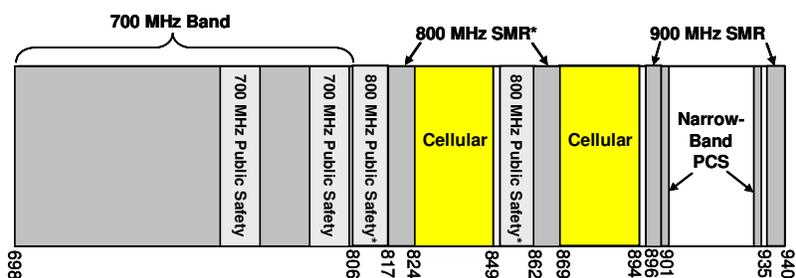
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¹⁴⁶ While no longer in operation, at one time the Commission’s CMRS spectrum cap restricted the distribution of certain spectrum licenses. Under the spectrum cap, no entity could control more than 45 megahertz of cellular, broadband PCS, and SMR spectrum in an MSA, or more than 55 megahertz in an RSA. In November 2001, however, the Commission decided to raise the spectrum cap to 55 megahertz in all markets effective February 13, 2002, and to eliminate the restriction entirely effective January 1, 2003. See 67 Fed. Reg. 1626 (Jan. 14, 2002).

¹⁴⁷ Under the original cellular licensing rules, one of the two cellular channel blocks in each market (the B block) was awarded to a local wireline carrier, while the other block (the A block) was awarded competitively to a carrier other than a local wireline incumbent. After awarding the first 30 MSA licenses pursuant to comparative hearing rules, the Commission adopted rules in 1984 and 1986 to award the remaining cellular MSA and RSA licenses through lotteries. By 1991, lotteries had been held for every MSA and RSA, and licenses were awarded to the lottery winners in most instances. In some RSA markets, however, the initial lottery winner was disqualified from receiving the license because of a successful petition to deny or other Commission action. Implementation of Competitive Bidding Rules to License Certain Rural Service Areas, *Report and Order*, 17 FCC Rcd 1960, 1961-1962 (2002). In 1997, the Commission auctioned cellular spectrum in areas unbuilt by the original cellular licensees. See FCC, *Auction 12: Cellular Unerved* (visited Apr. 12, 2002) <<http://wireless.fcc.gov/auctions/12/>>. (continued....)

systems were licensed in each market area. The Commission designated 50 megahertz of spectrum in the 800 MHz frequency band for the two competing cellular systems in each market (25 megahertz for each system). Initially, cellular systems offered service using analog technology, but today most of the service offered using cellular spectrum is digital.¹⁴⁸

698-940 MHz: Cellular Spectrum



(ii) Broadband PCS

79. Broadband PCS is similar to cellular service, except that broadband PCS systems operate in different spectrum bands and have been designed from the beginning to use a digital format. Broadband PCS licenses have been assigned through auction, beginning in 1995.¹⁴⁹ The Commission has set aside the spectrum between 1850 MHz and 1990 MHz for broadband PCS. This spectrum includes 120 megahertz used for mobile telephone services, divided originally into three blocks of 30 megahertz each (blocks A, B, and C) and three blocks of 10 megahertz each (blocks D, E, and F).¹⁵⁰ Two of the 30 megahertz blocks (A and B blocks) are assigned on the basis of 51 Major Trading Areas (“MTAs”).¹⁵¹ One of the 30 megahertz blocks (C block)¹⁵² and all three of the 10 megahertz blocks are assigned on the basis of 493 Basic Trading Areas (“BTAs”).¹⁵³

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In 2002, the Commission auctioned three RSA licenses where the initial lottery winner had been disqualified. *See* FCC, *Auction 45: Cellular RSA* (visited Jun. 7, 2002) <<http://wireless.fcc.gov/auctions/45/>>.

¹⁴⁸ See Section VI.B.1, Subscriber Growth, *infra*.

¹⁴⁹ The first auction was for two license blocks of 30 megahertz each. FCC Grants 99 Licenses for Broadband Personal Communications Services in Major Trading Areas, *News Release*, FCC, Jun. 23, 1995. The Commission has since had numerous additional broadband PCS auctions. *See* FCC, *Auctions Home* (visited Oct 1, 2007) <<http://wireless.fcc.gov/auctions/>>. Three licenses were also awarded as part of a pioneer preference program in 1994. Three Pioneer Preference PCS Applications Granted, *News Release*, FCC, Dec. 14, 1994.

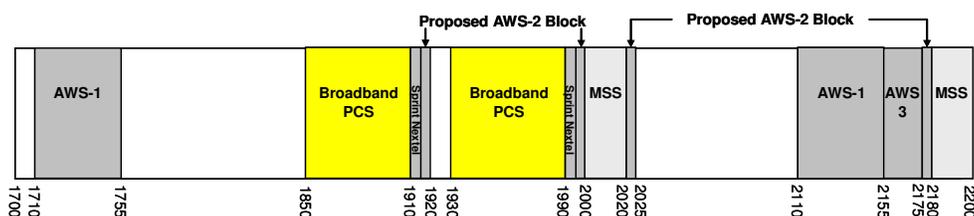
¹⁵⁰ Initially, the Commission’s broadband PCS allocation included 20 megahertz of spectrum at 1910 MHz - 1930 MHz for unlicensed broadband PCS. 10 megahertz has since been allocated on a nationwide basis to Sprint Nextel. *See* Improving Public Safety Communications in the 800 MHz Band, *Report and Order, Fifth Report and Order, Fourth Memorandum Opinion and Order, and Order*, 19 FCC Rcd. 14969, 15083 (2004).

¹⁵¹ Major Trading Areas are Material Copyright (c) 1992 Rand McNally & Company. Rights granted pursuant to a license from Rand McNally & Company through an arrangement with the Federal Communications Commission. Rand McNally’s MTA specification contains 47 geographic areas covering the 50 states and the District of Columbia. For its spectrum auctions, the Commission has added three MTA-like areas: Guam and the Northern Mariana Islands, Puerto Rico and the U.S. Virgin Islands, and American Samoa. In addition, Alaska was separated from the Seattle MTA into its own MTA-like area. MTAs are combinations of two or more BTAs.

¹⁵² The Commission has also reconfigured returned C block licenses. *See Tenth Report*, at 15935, note 150.

¹⁵³ Basic Trading Areas (“BTAs”) are Material Copyright (c) 1992 Rand McNally & Company. Rights granted pursuant to a license from Rand McNally & Company through an agreement with the Federal Communications (continued....)

1700-2200 MHz: Broadband PCS Spectrum



(iii) SMR

80. The Commission first established SMR in 1979 to provide for land mobile communications on a commercial basis. The Commission initially licensed spectrum in the 800 and 900 MHz bands for this service, in non-contiguous bands, on a site-by-site basis.¹⁵⁴ The Commission has since licensed additional SMR spectrum through auctions.¹⁵⁵ In total, the Commission has licensed 19 megahertz of SMR spectrum, plus an additional 7.5 megahertz of spectrum that is available for SMR as well as other services.¹⁵⁶ While Commission policy permits flexible use of this spectrum, including the provision of paging, dispatch, mobile voice, mobile data, facsimile, or combinations of these services,¹⁵⁷

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Commission. BTAs are geographic areas drawn based on the counties in which residents of a given BTA make the bulk of their shopping goods purchases. Rand McNally's BTA specification contains 487 geographic areas covering the 50 states and the District of Columbia. For its spectrum auctions, the Commission added additional BTA-like areas for: American Samoa; Guam; Northern Mariana Islands; San Juan, Puerto Rico; Mayagüez/Aguadilla-Ponce, Puerto Rico; and the U.S. Virgin Islands.

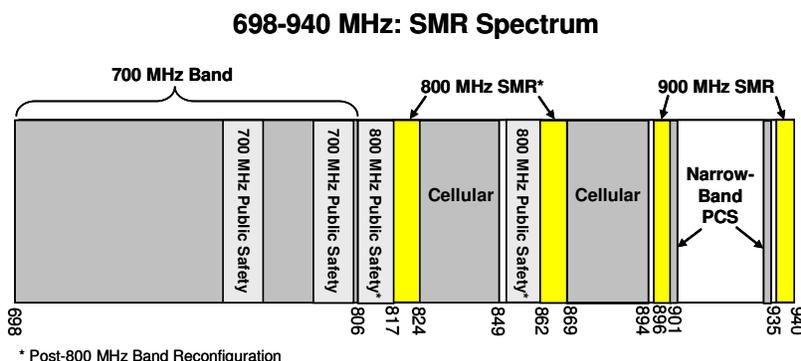
¹⁵⁴ The "900 MHz" SMR band refers to spectrum allocated in the 896-901 and 935-940 MHz bands; the "800 MHz" band refers to spectrum allocated in the 806-824 and 851-869 MHz bands. See 47 C.F.R. § 90.603; see also 47 C.F.R. § 90.7 (defining "specialized mobile radio system").

¹⁵⁵ The Commission has held multiple auctions for SMR licenses. FCC, *FCC Auctions* (visited July. 7, 2007) <<http://wireless.fcc.gov/auctions/>>.

¹⁵⁶ There are five megahertz in the 900 MHz band (200 paired channels x 12.5 kHz/channel). See 47 C.F.R. § 90.617, Table 4B. There are 21.5 megahertz in the 800 MHz band: 14 megahertz in the 800 SMR Service (280 paired channels x 25 kHz/channel) and 7.5 megahertz in the 800 MHz General Category (150 paired channels x 25 kHz/channel). See 47 C.F.R. § 90.615, Table 1 (SMR General Category) and 47 C.F.R. § 90.617, Table 4A (SMR Service). In 2000, the Commission amended its rules to allow Business and Industrial/Land Transportation licensees in the 800 MHz band to use their spectrum for CMRS operations under certain conditions. Implementation of Sections 309(j) and 337 of the Communications Act of 1934 as Amended Promotion of Spectrum Efficient Technologies on Certain Part 90 Frequencies; Establishment of Public Service Radio Pool in the Private Mobile Frequencies Below 800 MHz; Petition for Rule Making of The American Mobile Telecommunications Association, *Report and Order and Further Notice of Proposed Rule Making*, 15 FCC Rcd 22709, 22760-61 (2000). This could make up to five megahertz of additional spectrum available for digital SMR providers: 2.5 megahertz in the Industrial/Land Transportation Category (50 paired channels x 25 kHz/channel) and 2.5 megahertz in the Business Category (50 paired channels x 25 kHz/channel). See 47 C.F.R. § 90.617, Tables 2A and 3A. As discussed below in Section III.E.1.b, *infra*, the configuration of the 800 MHz band is changing as a result of a new band plan adopted by the Commission.

¹⁵⁷ Principles for Reallocation of Spectrum to Encourage the Development of Telecommunications Technologies for the New Millennium, *Policy Statement*, 14 FCC Rcd 19868 (1999); see also Applications of Various Subsidiaries and Affiliates of Geotek Communications, Inc., Debtor-In-Possession, Assignors, and Wilmington Trust Company or Hughes Electric Corporation, Assignees, For Consent to Assignment of 900 MHz Specialized Mobile Radio Licenses, *Memorandum Opinion and Order*, 15 FCC Rcd 790, 802 (2000).

the primary use for SMR traditionally was dispatch services.¹⁵⁸ With the development of digital technologies that increased spectral efficiency, SMR providers such as Sprint Nextel (on its iDEN network) and SouthernLINC Wireless, a unit of energy concern Southern Company, became more significant competitors in mobile telephony, while also maintaining dispatch functionality as a part of their service offerings. Furthermore, in apparent response to the dispatch functionality of SMR services, many cellular and broadband PCS providers now offer push-to-talk (“PTT”) functionality on their networks, including Verizon Wireless, AT&T, and Alltel. SMR spectrum is also used for certain data-only networks.¹⁵⁹



(a) 800 MHz Band Reconfiguration and 1.9 GHz Spectrum Exchange

81. On July 8, 2004, the Commission adopted a new band plan for the 800 MHz band to resolve the problem of interference to public safety radio systems operating in the band from CMRS providers operating systems on channels in close proximity to those utilized by public safety entities.¹⁶⁰ The new band plan addresses the root cause of the interference problem by separating generally incompatible technologies, with the costs of relocating 800 MHz incumbents to be paid by Sprint Nextel. To accomplish the reconfiguration, the Commission required Sprint Nextel to give up rights to certain of its licenses in the 800 MHz band and all of its licenses in the 700 MHz band. In exchange, the Commission modified Sprint Nextel’s licenses to provide the right to operate on two five-megahertz blocks in the 1.9 GHz band – specifically 1910-1915 MHz and 1990-1995 MHz – conditioned on Sprint Nextel fulfilling certain obligations specified in the Commission’s decision. As a new entrant in the 1.9 GHz band, Sprint Nextel is also obligated to fund the transition of incumbent users to comparable facilities. The Commission determined that the overall value of the 1.9 GHz spectrum is \$4.8 billion, less the cost of relocating incumbent users. In addition, the Commission decided to credit to Sprint Nextel the value of the spectrum rights that Sprint Nextel is relinquishing and the actual costs Sprint Nextel incurs to relocate all incumbents in the 800 MHz and 1.9 GHz bands. To the extent that the total of these combined credits is less than the assessed value of the 1.9 GHz spectrum rights, Sprint Nextel will make an anti-windfall payment equal to the difference to the United States Department of the Treasury at the conclusion of the relocation process.

¹⁵⁸ Dispatch services allow two-way, real-time, voice communications between fixed units and mobile units (*e.g.*, between a taxicab dispatch office and a taxi) or between two or more mobile units (*e.g.*, between a car and a truck). See *Fifth Report*, at 17727-17728, for a detailed discussion. Dispatch and SMR are often used interchangeably, although SMR refers to specific spectrum ranges.

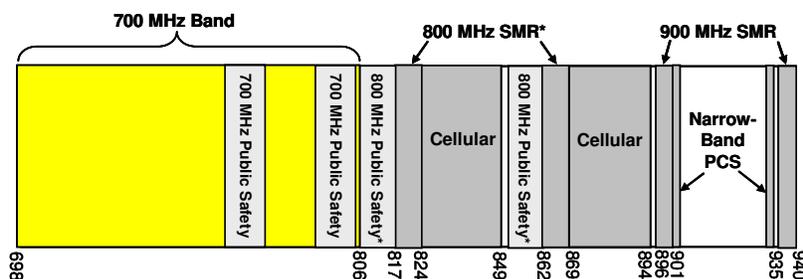
¹⁵⁹ See Section III.V.B.1.f, Narrowband Data Networks and Technology Deployment, *infra*.

¹⁶⁰ FCC Adopts Solution to Interference Problem Faced by 800 MHz Public Safety Radio Systems, *News Release*, Federal Communications Commission, Jul. 8, 2004.

(iv) 700 MHz Bands

82. The 698-806 MHz band (the “700 MHz band”) is being reclaimed from use by broadcast services in connection with the transition of the analog television service to digital television (“DTV”).¹⁶¹ The Digital Television Transition and Public Safety Act of 2005 (“DTV Act”)¹⁶² set a firm deadline of February 17, 2009 for the 700 MHz band spectrum to be cleared of analog transmissions and made available for public safety and commercial services as part of the DTV transition. The DTV Act established two specific statutory deadlines for the auction of recovered analog spectrum in the 700 MHz band: (1) the auction must begin no later than January 28, 2008; and (2) the auction proceeds must be deposited in the Digital Television Transition and Public Safety Fund by June 30, 2008.¹⁶³ Congress also extended the Commission’s auction authority to September 30, 2011.¹⁶⁴ This spectrum is being made available for wireless services, including public safety and commercial services.¹⁶⁵ Although the DTV Act established a date certain for the DTV transition, portions of the 700 MHz band are currently encumbered by television broadcasters, and may remain so until the end of the transition.¹⁶⁶ Nevertheless, there are substantial portions of the band that are not so encumbered and are available for immediate use by new licensees.

698-940 MHz: 700 MHz Band Spectrum



83. In light of the DTV Act, recent developments in the market for commercial wireless communications, and the evolving needs of the public safety community for advanced broadband communications, the Commission revisited its rules governing the 700 MHz band.¹⁶⁷ In 2007, the

¹⁶¹ See *700 MHz Second Report and Order*.

¹⁶² See Deficit Reduction Act of 2005, Pub. L. No. 109-171, 120 Stat. 4 (2006) (“DRA”). Title III of the DRA is the DTV Act.

¹⁶³ See DTV Act §§ 3002-04. “Recovered analog spectrum” is defined in the DTV Act. *Id.* § 3003.

¹⁶⁴ *Id.* § 3003(b).

¹⁶⁵ See *700 MHz Second Report and Order*, 22 FCC Rcd at 15291 ¶ 1, 15295-96 ¶ 14.

¹⁶⁶ See *Reallocation and Service Rules for the 698-746 MHz Spectrum Band (Television Channels 52-59)*, *Report and Order*, 17 FCC Rcd 1022, 1028 ¶ 9 (2002) (“*Lower 700 MHz Report and Order*”).

¹⁶⁷ See *Service Rules for the 698-749/746, 747-762 and 777-792 MHz Bands*, WT Docket No. 06-150, *Revision of the Commission’s Rules to Ensure Compatibility with Enhanced 911 Emergency Calling Systems*, CC Docket No. 94-102, and Section 68.4(a) of the Commission’s Rules Governing Hearing Aid-Compatible Telephones, WT Docket No. 01-309, *Notice of Proposed Rule Making, Fourth Further Notice of Proposed Rule Making, and Second Further Notice of Proposed Rule Making*, 21 FCC Rcd 9345 (2006) (“*700 MHz Commercial Services Notice*”).

Commission adopted a new band plan and revised certain of the rules relating to the 700 MHz band.¹⁶⁸ The new band plan provides a balanced mix of geographic service area licenses and spectrum blocks sizes for the commercial spectrum that is to be auctioned.¹⁶⁹ The new band plan also includes one spectrum block that will be licensed as part of a Public/Private Partnership entered with a national public safety broadband licensee for the public safety broadband spectrum in the 700 MHz band to promote the development of nationwide interoperable broadband services for public safety users.¹⁷⁰ Licensees for another commercial block of spectrum in the 700 MHz band will be required to allow customers, device manufacturers, third-party application developers, and others to use or develop the devices and applications of their choice, subject to certain conditions.¹⁷¹

84. The Commission has scheduled the auction of 700 MHz band licenses, comprising 62 megahertz, for January 24, 2008.¹⁷² The remaining 22 megahertz of commercial spectrum in this band has already been auctioned and licensed. The total 84 megahertz of commercial spectrum in the 700 MHz band will generally be open to a broad range of flexible uses.¹⁷³ This spectrum has many permissible

¹⁶⁸ See *700 MHz Second Report and Order*, 22 FCC Rcd at 15291-95 ¶¶ 1-13; Service Rules for the 698-746, 747-762 and 777-792 MHz Bands, WT Docket No. 06-150, Report and Order and Further Notice of Proposed Rulemaking, 22 FCC Rcd 8064 (2007) (“*700 MHz Report and Order*” and “*700 MHz Further Notice*”, respectively).

¹⁶⁹ The Commission changed the location of existing 700 MHz Guard Band licenses, provided for a 1-megahertz shift of the other commercial blocks in the Upper 700 MHz band and in the spectrum allocated to public safety, and reduced the size of the Guard Band B Block to make two additional megahertz of commercial spectrum available for auction. *700 MHz Second Report and Order*, 22 FCC Rcd at 15292-93 ¶ 3. In addition, the Commission afforded all Guard Band A Block licensees the same technical rules that apply to the adjacent commercial spectrum and the ability to deploy cellular architectures. *Id.* at 15294 ¶ 9.

¹⁷⁰ See *700 MHz Second Report and Order*, 22 FCC Rcd at 15292-93 ¶ 3.

¹⁷¹ *Id.* ¶ 195. “The Commission has found that the Commercial Mobile Radio Services (CMRS) market is effectively competitive, and that competitive pressures continue to result in the introduction of innovative pricing plans and service offerings. [Footnote omitted.] We have not found, however, that competition in the CMRS marketplace is ensuring that consumers drive handset and application choices, especially in the emerging wireless broadband market.” *700 MHz Second Report and Order*, 22 FCC Rcd at 15362-63 ¶ 200. Specifically, the Commission expressed concern that “certain practices in the wireless industry may constrain consumer access to wireless broadband networks and limit the services and functionalities provided to consumers by these networks.” *Id.* at 15362 ¶ 198. In adopting the Open Platform requirement to the Upper 700 MHz C Block, the Commission noted: “Although we generally prefer to rely on marketplace forces as the most efficient mechanism for fostering competition, we conclude that the 700 MHz spectrum provides an important opportunity to apply requirements for open platforms for devices and applications for the benefit of consumers, without unduly burdening existing services and markets.” *Id.* at 15361 ¶ 195.

¹⁷² Auction of 700 MHz band Licenses Scheduled for January 24, 2008, Notice and Filing Requirements, Minimum Opening Bids, Reserve Prices, Upfront Payments, and Other Procedures for Auctions 73 and 76, *Public Notice*, 22 FCC Rcd 18141 (2007).

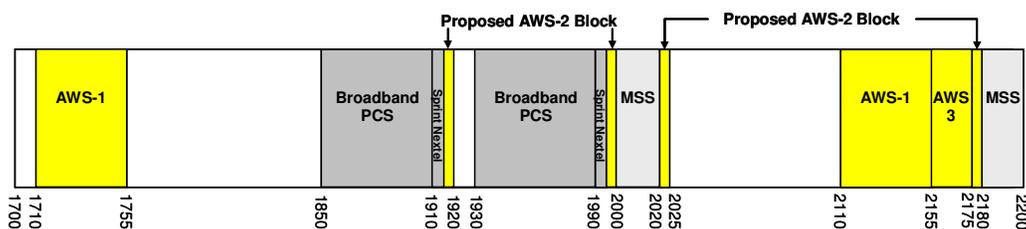
¹⁷³ See *Lower 700 MHz Report and Order*; Service Rules for the 746-764 and 776-794 MHz Bands, and Revisions to Part 27 of the Commission’s Rules, WT Docket No. 99-168, *Third Report and Order*, 16 FCC Rcd 2703 (2001); Service Rules for the 746-764 and 776-794 MHz Bands, and Revisions to Part 27 of the Commission’s Rules, WT Docket No. 99-168, *Second Memorandum Opinion and Order*, 16 FCC Rcd 1239 (2001); Service Rules for the 746-764 and 776-794 MHz Bands, and Revisions to Part 27 of the Commission’s Rules, WT Docket No. 99-168, *Memorandum Opinion and Order and Further Notice of Proposed Rulemaking*, 15 FCC Rcd 20845 (2000); Service Rules for the 746-764 and 776-794 MHz Bands, and Revisions to Part 27 of the Commission’s Rules, WT Docket No. 99-168, *Second Report and Order*, 15 FCC Rcd 5299 (2000) (“*Upper 700 MHz Second Report and Order*”); *700 MHz Second Report and Order*; *700 MHz Report and Order*. The eighty-two megahertz of spectrum does not include the reconfigured Guard Band B Block spectrum at 775-776/805-806 MHz. See *700 MHz Second Report and Order*, 22 FCC Rcd at 15294 ¶ 9, 15388-89 ¶¶ 266-69.

uses: new licensees may use the spectrum for fixed, mobile (including mobile wireless commercial services), and broadcast services.¹⁷⁴ In addition, the Commission recently optimized the power rules in the remaining paired spectrum specifically for mobile use.¹⁷⁵ The Commission expects that many of the new technologies to be developed and deployed in this band will support advanced wireless applications.¹⁷⁶

(v) Advanced Wireless Services

85. U.S. mobile providers have the flexibility to deploy advanced wireless technologies, including those commonly called Third Generation or “3G,” that allow them to offer high-speed mobile data services using their existing CMRS spectrum.¹⁷⁷ To further the goal of promoting the deployment of advanced services, the Commission has made efforts to allocate and license additional spectrum suitable for offering AWS.¹⁷⁸ As noted in the *Eleventh Report*, in 2002 the Commission, together with the National Telecommunications and Information Administration (“NTIA”), allocated 90 megahertz of spectrum in the 1710-1755 and 2110-2155 MHz bands that can be used to offer advanced wireless services, including 3G services.¹⁷⁹

1700-2200 MHz: Advanced Wireless Services Spectrum



86. Subsequently, the Commission completed the process of establishing service rules for the 1710-1755 and 2110-2155 MHz bands. This included a determination that the spectrum could be used for any wireless service that is consistent with the spectrum’s fixed and mobile allocations and would be licensed under the Commission’s flexible, market-oriented Part 27 rules,¹⁸⁰ and also a band plan that provided for a significant amount of the spectrum to be licensed on a small geographic basis to encourage the participation of small and rural providers in the AWS auction.¹⁸¹ In 2006, the Commission established procedures for the auction of the 1710-1755 MHz and 2110-2155 MHz bands (“Auction

¹⁷⁴ See generally *id.*

¹⁷⁵ See *700 MHz Report and Order*, 22 FCC Rcd at 8067-68 ¶ 6.

¹⁷⁶ See, *i.e.*, *Lower 700 MHz Report and Order*, 17 FCC Rcd at 1032 ¶ 20.

¹⁷⁷ 47 C.F.R. §§ 20.901(a) and 24.3.

¹⁷⁸ Advanced Wireless Services (AWS) is the collective term we use for new and innovative fixed and mobile terrestrial wireless applications using bandwidth that is sufficient for the provision of a variety of applications, including those using voice and data (such as Internet browsing, message services, and full-motion video) content.

¹⁷⁹ *Eleventh Report*, at 10977. The Commercial Spectrum Enhancement Act, signed into law on December 23, 2004, establishes a Spectrum Relocation Fund to reimburse federal agencies operating on certain frequencies that have been reallocated to non-federal use, including the 1710-1755 MHz band, for the cost of relocating their operations. See Commercial Spectrum Enhancement Act, Pub. L. No. 108-494, 118 Stat. 3986, Title II (2004).

¹⁸⁰ *Eleventh Report*, at 10977-10978; 47 C.F.R. Part 27.

¹⁸¹ *Eleventh Report*, at 10978.

66”).¹⁸²

87. In 2006, the Commission also established procedures by which AWS licensees could relocate existing incumbents in the 1710-1755 MHz and 2110-2155 MHz bands to other spectrum. The 1710-1755 MHz band includes incumbent federal government spectrum users, and NTIA is overseeing the coordination with and relocation of these users under the coordination procedures released by the FCC and NTIA in April 2006.¹⁸³ The 2110-2155 MHz band includes fixed microwave service licensees and BRS licensees. For the band, the Commission established rules under which other new licensees benefiting from the relocation of an incumbent would share in the costs of the relocation.¹⁸⁴

88. The Commission held Auction 66 in the third quarter of 2006.¹⁸⁵ Of the 1,122 licenses offered in Auction 66, 104 winning bidders won 1,087 licenses, with net bids of more than \$13.7 billion.¹⁸⁶ In April 2007, the Wireless Bureau announced that licensing had been completed for all of the licenses, with the exception of one license subject to a later deadline for the applicant to file a certification to qualify for a Tribal Land Bidding Credit.¹⁸⁷

89. The Commission has also taken significant steps toward licensing other bands of spectrum for use by AWS. In 2004, the Commission allocated an additional twenty megahertz of spectrum in the 1915-1920 MHz, 1995-2000 MHz, 2020-2025 MHz and 2175-2180 MHz bands (“AWS-2”).¹⁸⁸ The Commission additionally released the *AWS-2 Service Rules NPRM*, which sought comment on appropriate service rules for the 1915-1920 MHz, 1995-2000 MHz, 2020-2025 MHz and 2175-2180 MHz bands, and also offered some tentative conclusions consistent with existing AWS service rules, such as allowing flexible use of this spectrum and licensing this spectrum under Part 27 of the Commission’s rules.

90. In 2005, the Commission designated yet another 20 MHz of spectrum for AWS,

¹⁸² See Auction of Advanced Wireless Services Licenses Scheduled For June 29, 2006, *Public Notice*, 21 FCC Rcd 4562 (2006); Auction of Advanced Wireless Services Licenses Rescheduled for August 9, 2006, *Public Notice*, 21 FCC Rcd 5598 (2006).

¹⁸³ See The Federal Communications Commission and the National Telecommunications and Information Administration – Coordination Procedures in the 1710-1755 MHz Band, *Public Notice*, 21 FCC Rcd 4730 (2006).

¹⁸⁴ See Amendment of Part 2 of the Commission’s Rules to Allocate Spectrum Below 3 GHz for Mobile and Fixed Services to Support the Introduction of New Advanced Wireless Services, including Third Generation Wireless Systems, ET Docket No. 00-258, *Services Rules for Advanced Wireless Services in the 1.7 GHz and 2.1 GHz Bands*, WT Docket No. 02-353, *Ninth Report and Order and Order*, 21 FCC Rcd 4473 (2006).

¹⁸⁵ The auction started on August 9, 2006 and closed on September 18, 2006. See Auction of Advanced Wireless Services Closes: Winning Bidders Announced for Auction 66, Report AUC-06-66-F, *Public Notice*, 21 FCC Rcd 10521 (WTB 2006) (“*Closing PN*”). In Auction 66, the Commission made available 1,122 AWS licenses in the 1710-1755 MHz and 2110-2155 MHz bands (“AWS-1”).

¹⁸⁶ *Id.*

¹⁸⁷ See *Wireless Telecommunications Bureau Completes Review of Applications for Licenses for Advanced Wireless Services*, News Release, FCC, Apr. 30, 2007.

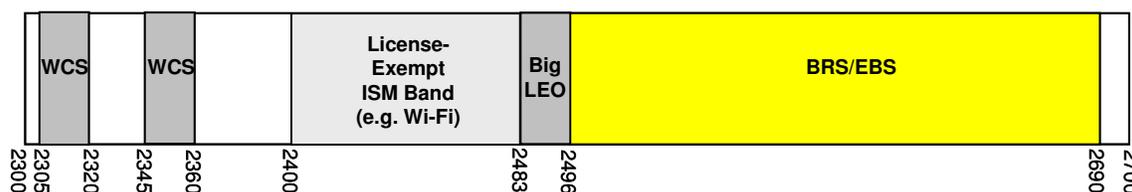
¹⁸⁸ Amendment of Part 2 of the Commission’s Rules to Allocate Spectrum Below 3 GHz for Mobile and Fixed Services to Support the Introduction of New Advanced Wireless Services, Including Third Generation Wireless Systems, ET Docket No. 00-258, *Sixth Report and Order, Third Memorandum Opinion and Order and Fifth Memorandum Opinion and Order*, 19 FCC Rcd 20720 (2004); *Service Rules for Advanced Wireless Services in the 1915-1920 MHz, 1995-2000 MHz, 2020-2025 MHz and 2175-2180 MHz Bands; Service Rules for Advanced Wireless Services in the 1.7 GHz and 2.1 GHz Bands*, WT Docket No. 04-356; WT Docket No. 02-353, *Notice of Proposed Rulemaking*, 19 FCC Rcd 19263 (2004) (“*AWS-2 Service Rules NPRM*”).

specifically the 2155-2175 MHz band (“AWS-3”), thus establishing 70 MHz of contiguous AWS spectrum in the 2.1 GHz band (from 2110 to 2180 MHz).¹⁸⁹ An application for exclusive use of the spectrum in the 2155-2175 MHz band was filed in 2006, and was accepted for filing in January 2007.¹⁹⁰ Subsequently, six other applicants filed similar applications for use of this AWS-3 spectrum.¹⁹¹ On August 31, 2007, the Commission released an Order dismissing these seven applications without prejudice and denying two Forbearance Petitions associated with two of the applications, finding that the public interest is best served by first seeking public comment on how the band should be used and licensed.¹⁹² On September 19, 2007, the Commission released a Notice of Proposed Rulemaking, seeking comment on service rules for the AWS-3 spectrum.¹⁹³

(vi) Broadband Radio Service

91. In July 2004, the Commission transformed the rules and policies governing the Multipoint Distribution Service (MDS) and the Instructional Television Fixed Service (ITFS) in the 2500-2690 MHz band by providing licensees with greater flexibility and establishing a more functional band plan.¹⁹⁴ As one part of this action, the Commission renamed the MDS service the “Broadband Radio Service” (BRS) and renamed the ITFS service the Educational Broadband Service (EBS).

2300-2700 MHz: BRS/EBS Spectrum



92. The Commission took several steps to restructure the BRS/EBS band and facilitate more

¹⁸⁹ See Amendment of Part 2 of the Commissions Rules to Allocate Spectrum Below 3 GHz for Mobile and Fixed Services to Support the Introduction of New Advanced Wireless Services, Including Third Generation Wireless Systems, ET Docket No. 00-258, *Eighth Report and Order, Fifth Notice of Proposed Rule Making and Order*, 20 FCC Rcd 15866 (2005).

¹⁹⁰ See Application of M2Z Networks, Inc. for License and Authority to Provide a National Broadband Radio Service in the 2155-2175 MHz Band (filed May 5, 2006) (M2Z Application). See “Wireless Telecommunications Bureau Announces that M2Z Networks, Inc.’s Application for License and Authority to Provide a National Broadband Radio Service in the 2155-2175 MHz Band is Accepted for Filing,” WT Docket No. 07-16, *Public Notice*, 22 FCC Rcd 1955 (WTB 2007). See also Wireless Telecommunications Bureau Sets Pleading Cycle for Application by M2Z Networks, Inc. to be Licensed in the 2155-2175 MHz Band, WT Docket No. 07-16, *Public Notice*, 22 FCC Rcd 4442 (WTB 2007).

¹⁹¹ Specifically, there were applications filed by Commnet Wireless, LLC; McElroy Electronics Corp.; NetfreeUS, LLC; NextWave Broadband, Inc.; and Open Range Communications, Inc.; each on Mar. 2, 2007; and by TowerStream Corporation on Mar. 15, 2007. See WT Docket No. 07-16.

¹⁹² Applications for License and Authority to Operate in the 2155-2175 MHz Band, WT Docket No. 07-16, *Order*; Petitions for Forbearance Under 47 U.S.C. § 160, *Order*, 22 FCC Rcd 16563 (2007), *recons pending*.

¹⁹³ In the Matter of Service Rules for Advanced Wireless Services in the 2155-2175 MHz Band, *Notice of Proposed Rulemaking*, 22 FCC Rcd 17035 (2007).

¹⁹⁴ Amendment of Parts 1, 21, 73, 74, and 101 of the Commission’s Rules to Facilitate the Provision of Fixed and Mobile Broadband Access, Educational, and Other Advanced Services in the 2150-2162 and 2500-2690 MHz Bands, WT Docket No. 03-66, *Report and Order and Further Notice of Proposed Rulemaking*, 19 FCC Rcd 14165 (2004). The rules for this band were initially established in 1963 but have evolved significantly since that time.

efficient use of the spectrum. First, the Commission expanded the 2500-2690 MHz band by five megahertz, from 2495-2500 MHz, to accommodate the relocation of BRS Channels 1 and 2, which are presently located in the 2.1 GHz band. Specifically, the Commission created a one-megahertz guard band, 2495-2496 MHz, to separate incumbent operations below 2495 MHz and new BRS Channel 1 licensees that would operate at 2496-2502 MHz. Second, the Commission created a new BRS/EBS band plan for the 2496-2690 MHz band that eliminated the use of interleaved channels and created distinct band segments for high power operations, such as one-way video transmission, and low power operations, such as two-way fixed and mobile broadband applications. By grouping high and low power users into separate portions of the band, the new band plan reduces the likelihood of interference caused by incompatible uses and creates incentives for the development of low-power, cellularized broadband operations, which were inhibited by the prior band plan.

93. In addition, the Commission provided licensees with the flexibility to employ the technologies of their choice in the band and to lease spectrum under the Commission's secondary market spectrum leasing policies and procedures. The Commission also implemented geographic area licensing for all licensees in the band, which will allow increased flexibility while reducing administrative burdens on both licensees and the Commission.

94. In April 2006, the Commission continued its transformation of the rules governing BRS and EBS by revising the mechanism for transition from the existing band configuration to the new band plan.¹⁹⁵ BRS and EBS providers will have thirty months from the effective date of the new rules during which they may propose transition plans for relocating existing facilities of all other licensees within the same BTA to new spectrum assignments in the revised band plan. Plan proponents must notify all licensees in the BTA and file their plans with the Commission. As of July 2007, proponents had filed transition plans for 298 of the 493 BTAs, and completed the transition in 50 BTAs.¹⁹⁶

95. The Commission also allowed licensees to transition themselves if no proponent came forward in a BTA by the deadline for filing transition plans. It also made other changes to the transition rules to facilitate transitions to the new band plan. With respect to lease agreements, the Commission held that EBS licensees are permitted to enter into excess capacity leases for a maximum of 30 years, but leases with terms of 15 years or longer must include a right to review the educational use requirements of the leases every five years starting at year 15.

96. The changes made to the 2496-2690 MHz band should enable BRS/EBS providers to use this spectrum in a more technologically and economically efficient manner. The goal of the new rules is to facilitate the growth of new and innovative wireless technologies and services, including wireless broadband services that have the potential to compete with cable and DSL broadband providers and to extend broadband service to rural and underserved areas.

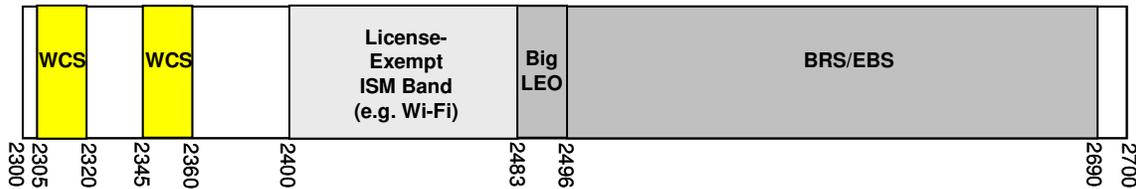
¹⁹⁵ Amendment of Parts 1, 21, 73, 74, and 101 of the Commission's Rules to Facilitate the Provision of Fixed and Mobile Broadband Access, Educational, and Other Advanced Services in the 2150-2162 and 2500-2690 MHz Bands, *Order on Reconsideration and Fifth Memorandum Opinion and Order and Third Memorandum Opinion and Order and Second Report and Order*, 21 FCC Rcd 5606 (2006).

¹⁹⁶ See Initiation Plans and Post-Transition Notifications filed in WT Docket No. 06-136. See also Wireless Telecommunications Bureau Establishes Docket for the Filing of Initiation Plans, Post-Transition Notifications, and Self Transition Notices in the Transition of the 2500-2690 MHz Band, *Public Notice*, 21 FCC Rcd 7909 (2006).

(vii) Wireless Communications Service (WCS)

97. The Commission has licensed 30 megahertz of spectrum in the 2.3 GHz band, at 2305-2320 MHz and 2345-2360 MHz, for the Wireless Communications Service (“WCS”). The WCS spectrum is adjacent to and separated by the spectrum band for the Satellite Digital Audio Radio Service, which is used by XM and Sirius to provide satellite radio service. The service rules governing WCS are flexible, and WCS licensees can use this spectrum to provide a variety of fixed or mobile wireless services. The WCS spectrum was auctioned in 1997 and licensed on a Major Economic Area (“MEA”) and Regional Economic Area Grouping (“REAG”) basis. As described below, wireless providers have begun using WCS spectrum to deploy wireless broadband services.

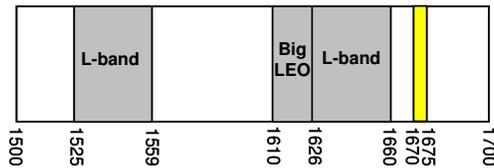
2300-2700 MHz: WCS Spectrum



(viii) 1670-1675 MHz

98. In April 2003, the FCC auctioned five megahertz of unpaired spectrum in the 1670-1675 MHz band as a single, nationwide license. As with the other spectrum bands licensed under Part 27 of the Commission’s rules, such as AWS and WCS, the service rules for the 1670-1675 MHz band are flexible, and licensees can use the spectrum to deploy a variety of fixed or mobile wireless services. The license was won at auction by Crown Castle. In July 2007, Crown Castle announced that it had entered into a long-term agreement to lease the spectrum to a venture formed by Telecom Ventures, LLC and Columbia Capital, LLC.¹⁹⁷

1500-1700 MHz: 1670-1675 MHz Spectrum



(ix) Narrowband Spectrum

99. In addition to the spectrum that mobile telephone providers use to offer both voice and data CMRS services, two additional spectrum bands – paging and narrowband PCS – are used by licensees to offer CMRS services that consist only of data communications. Spectrum designated for commercial messaging/paging is spread across several non-contiguous bands: 35-36 MHz, 43-44 MHz, 152-159 MHz, 454-460 MHz, and 929-932 MHz.¹⁹⁸ Each license consists of between 20 and 50 kilohertz.¹⁹⁹ The Commission first allocated spectrum for paging in 1949 and licensed the spectrum on a

¹⁹⁷ *Crown Castle Announces Long-Term Mobile Spectrum Lease*, News Release, Crown Castle, July 23, 2007; ULS Lease ID L000002305. See Section III.B.4, *Mobile Video Providers*, *supra*, for a further discussion of Crown Castle.

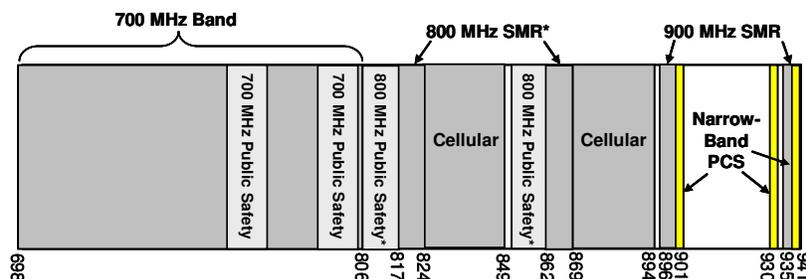
¹⁹⁸ FCC, *Paging (Lower) Bandplan*, <<http://wireless.fcc.gov/auctions/data/bandplans/pagingLwrband.pdf>>; FCC, *929 and 931 MHz Paging Bandplan*, <<http://wireless.fcc.gov/auctions/data/bandplans/auc26bnd.pdf>>.

¹⁹⁹ *Id.*

site-by-site basis through the mid-1990s.²⁰⁰ In 2000 the Commission began auctioning additional paging licenses on a geographic area basis using EAs and MEAs.²⁰¹ The Commission completed its third paging auction on May 28, 2003.²⁰²

100. Narrowband PCS spectrum is located in the 901-902 MHz, 930-931 MHz, and 940-941 MHz bands and allows licensees to offer an array of two-way data services such as text messaging.²⁰³ The Commission first auctioned narrowband PCS spectrum in 1994.²⁰⁴ Licenses consist of between 50 and 200 kilohertz each and were auctioned on a nationwide, regional, and MTA basis.²⁰⁵ The Commission completed its most recent auction of narrowband PCS licenses on September 25, 2003.²⁰⁶

698-941 MHz: Narrowband PCS Spectrum



2. Non-Regulatory Barriers to Entry

101. There are three basic types of potential non-regulatory entry barriers, each of which captures separate dimensions of the difficulty of entering an industry.²⁰⁷ The first type consists of the impediment to entry erected by advertising expenditures. Unlike tangible capital, advertising can neither be resold nor otherwise transferred to prospective buyers; such expenditures are irrecoverable or sunk. While the incumbent has already incurred the sunk costs, the entrant has not. Therefore, the entrant has higher incremental cost and incremental risk associated with its decision to enter. The second type of

²⁰⁰ Revision of Part 22 and Part 90 of the Commission's Rules to Facilitate Future Development of Paging Systems, Implementation of Section 309(j) of the Communications Act – Competitive Bidding, *Notice of Proposed Rulemaking*, 11 FCC Rcd 3108, 3109-3110 (1996).

²⁰¹ See 929 and 931 MHz Paging Auction Closes, *Public Notice*, 15 FCC Rcd 4858 (2000); *Seventh Report*, at 13050-13051.

²⁰² Lower and Upper Paging Bands Auction Closes, *Public Notice*, 18 FCC Rcd 11154 (2003).

²⁰³ Implementation of Section 309(j) of the Communications Act – Competitive Bidding Narrowband PCS, PP Docket No. 93-253, *Third Memorandum Opinion and Order and Further Notice of Proposed Rulemaking*, 10 FCC Rcd 175 (1994).

²⁰⁴ Announcing the High Bidders in the Auction of Ten Nationwide Narrowband PCS Licenses; Winning Bids Total \$617,006,674, *Public Notice*, PNWL 94-4 (rel. Aug. 2, 1994).

²⁰⁵ *Id.*; Announcing the High Bidders in the Auction of 30 Regional Narrowband PCS Licenses; Winning Bids Total \$490,901,787, *Public Notice*, PNWL 94-27 (rel. Nov. 9, 1994).

²⁰⁶ Regional Narrowband PCS Spectrum Auction Closes, *Public Notice*, 18 FCC Rcd 19689 (2003); Narrowband PCS Spectrum Auction Closes, *Public Notice*, 18 FCC Rcd 19751 (2003). See, also, *Ninth Report*, at 20636-20637.

²⁰⁷ See William J. Baumol and Robert D. Willig, *Fixed Cost, Sunk Cost, Entry Barriers and Sustainability of Monopoly*, QUARTERLY JOURNAL OF ECONOMICS, Vol. 96, Aug. 1981, at 406-431; Joe S. Bain, *Barriers to New Competition*, 1956, at 55; William S. Comanor and Thomas A. Wilson, *Advertising Market Structure and Performance*, THE REVIEW OF ECONOMICS AND STATISTICS, Vol. 49, Nov. 1967, at 425.

entry barrier arises from economies of scale, which allow firms to lower the cost per unit of producing and distributing a product as the volume of output expands. The more extensive economies of scale are, the larger the minimum efficient scale is relative to the size of the market. Consequently, a nascent firm risks depressing market price by producing at optimal scale. The alternative is to produce at less than minimum cost. Either way, expected profitability is lowered, and entry is dissuaded. The third type of entry barrier, and closely related to the second, is the inability of new firms to borrow sums sufficient to finance efficient start-ups. The inability to borrow sufficiently increases with the larger absolute capital requirement needed to realize minimum cost.

102. All three types of entry barriers have the potential to afford incumbent carriers first-mover advantages over latecomers. Therefore, it is possible that the three types of entry barriers are significant in mobile telephone service. Telecommunications has historically been an industry characterized by large investments in network infrastructure and vast scale economies, suggesting the scale economy and capital requirement barriers are both high. Increasing advertising expenditures by mobile telephone providers as they seek to brand their products suggests that the product differentiation barrier in mobile telephone service is similarly high. In this regard, the *Eleventh Report* noted that the four nationwide operators alone spent a total of \$3.5 billion on advertising in 2005,²⁰⁸ and data provided in Section IV of this report shows that there was a significant increase in advertising spending for wireless telephone services in 2006.²⁰⁹

F. Rural Markets

1. Geographical Comparisons: Urban vs. Rural

103. Since the release of the *Sixth Report*,²¹⁰ the Commission has attempted to obtain a better understanding of the state of competition below the national level, and particularly in rural areas. The Communications Act does not include a statutory definition of what constitutes a rural area.²¹¹ The Commission used RSAs as a proxy for rural areas for certain purposes, such as the former cellular cross-interest rule and the former CMRS spectrum cap, stating that “other market designations used by the Commission for CMRS, such as [EAs], combine urbanized and rural areas, while MSAs and RSAs are defined expressly to distinguish between rural and urban areas.”²¹² Since its 2004 Report and Order concerning deployment of wireless services in rural areas, however, the Commission has adopted a “baseline” definition of rural as a county with a population density of 100 persons or fewer per square mile.²¹³ For this reason, we adopt this same definition to analyze service availability in rural areas in this

²⁰⁸ *Eleventh Report*, at 10998.

²⁰⁹ See Section IV.B.4, Advertising and Marketing, *infra*.

²¹⁰ *Sixth Report*, at 13350.

²¹¹ The federal government has multiple ways of defining rural, reflecting the multiple purposes for which the definitions are used. *Eighth Report*, at 14834; Facilitating the Provision of Spectrum-Based Service to Rural Areas and Promoting Opportunities for Rural Telephone Companies to Provide Spectrum-Based Services, *Notice of Proposed Rulemaking*, 18 FCC Rcd 20802 (2003) (“*Rural NPRM*”), at 20808-11.

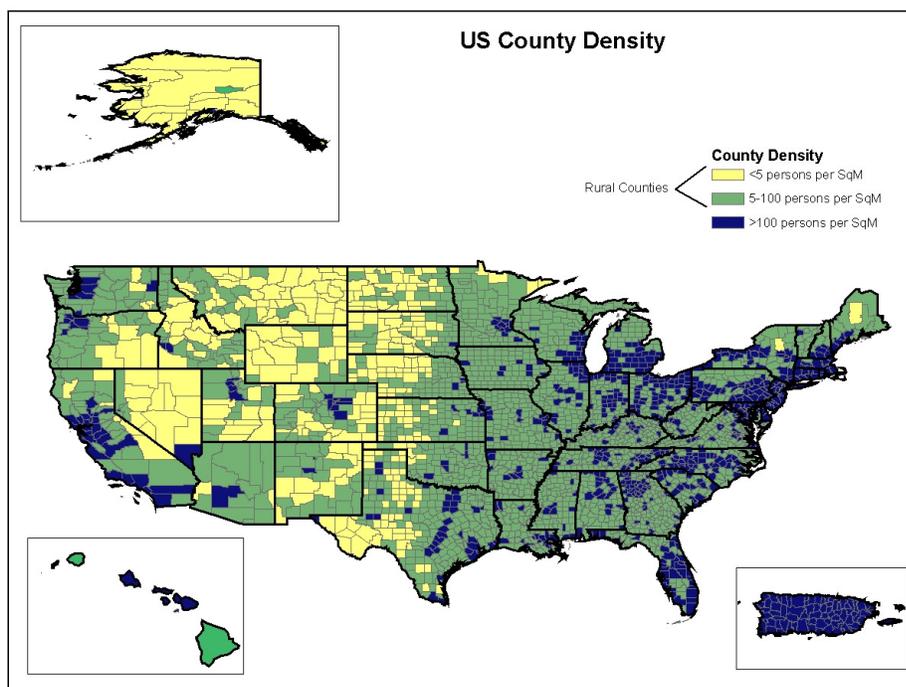
²¹² Biennial Regulatory Review, Spectrum Aggregation Limits for Wireless Telecommunications Carriers, *Report and Order*, 15 FCC Rcd 9219, 9256 at note 203 (1999).

²¹³ Facilitating the Provision of Spectrum-Based Services to Rural Areas and Promoting Opportunities for Rural Telephone Companies To Provide Spectrum-Based Services, *Report and Order*, 19 FCC Rcd. 19078, at 19087-19088 (2004) (“We recognize, however, that the application of a single, comprehensive definition for ‘rural area’ may not be appropriate for all purposes. . . Rather than establish the 100 persons per square mile or less designation as a uniform definition to be applied in all cases, we instead believe that it is more appropriate to treat this definition as a presumption that will apply for current or future Commission wireless radio service rules, policies and analyses (continued....)”).

report.

104. By this definition, roughly 61 million people, or 21 percent of the US population,²¹⁴ live in rural counties. These counties comprise 3.1 million square miles, or 86 percent of the geographic area of the U.S.²¹⁵ The distribution of rural counties across the United States can be seen in the map below.

Map 3: US County Distribution²¹⁶



2. Rural Competition

105. In comparing competitive entry in counties with population densities of 100 persons per square mile or less to those with densities greater than 100 persons per square mile, we find that the less densely populated counties have an average of 3.6 mobile competitors, while the more densely populated counties have an average of 4.3 competitors.²¹⁷ The average number of competitors in the less densely (Continued from previous page) _____

for which the term 'rural area' has not been expressly defined. By doing so, we maintain continuity with respect to existing definitions of 'rural' that have been tailored to apply to specific policies, while also providing a practical guideline.”).

²¹⁴ Including the populations of Puerto Rico and the Virgin Islands.

²¹⁵ Including the populations of Puerto Rico and the Virgin Islands.

²¹⁶ A larger version of this map may be found in Appendix B.

²¹⁷ This analysis was done using publicly-available coverage data of mobile telephone providers, not data from American Roamer. In its 2006 Wireless Survey, NTCA found that its “[s]urvey respondents are facing considerable competition from other carriers—the average respondent indicated that their company competes with between three and five other carriers.” *NTCA 2006 Wireless Survey Report*, NATIONAL TELECOMMUNICATIONS COOPERATIVE ASSOCIATION, Jan. 2007, available at <http://www.ntca.org/content_documents/2006NTCAWirelessSurveyReport.pdf> (visited Nov. 20, 2007) (“2006 NTCA Wireless Survey”).

populated counties generally has remained unchanged for the past 4 years, whereas the average number of competitors in the more densely populated counties declined by 12 percent from an average of 4.9 competitors in the previous year, a 11 percent decline from the year before that, and a 7 percent decline from the *Ninth Report*.²¹⁸ In the *Eighth Report*, the difference in the average number of competitors between urban and rural counties was 2.3, while in this report we find that that difference has shrunk 70 percent, to 0.7 competitors.

Table 9: Rural vs. Urban Competitors Over Time

	Average Number of Mobile Telephone Competitors				
	12th Report	11th Report	10th Report	9th Report	8th Report
Rural Counties	3.6	3.6	3.7	3.7	3.3
Urban Counties	4.3	4.9	5.5	5.9	5.6

Source: Federal Communications Commission estimates.

106. In addition, using data provided by American Roamer, we find that 99.3 percent of the total US population in rural counties is covered by at least one wireless provider.²¹⁹

107. According to one commenter, overall penetration in rural areas is only slightly lower than in urban areas. Using 2005 FCC data on penetration rates by EA, CTIA estimated that the wireless penetration rate in rural areas is 68 percent, while the rate in urban areas is 75 percent, a difference of 7 percent.²²⁰ According to CTIA, “Publicly available data and aggregated industry data reveal that the wireless industry strives to reach consumers in both urban and rural, underserved regions of the country.”²²¹

108. Providers based in rural areas seem to be providing many of the services that nationwide providers do. In the fall of 2006, the National Telecommunications Cooperative Association (“NTCA”) surveyed its members regarding their provision of wireless services.²²² Population density in most NTCA member service areas is extremely rural, between 1 and 5 persons per square mile.²²³ Survey respondents indicated that they have invested considerable resources for the provision of wireless service.²²⁴ Of those members providing wireless service, all offer voicemail and caller ID, 96 percent family plans, 85 percent free long distance, 81 percent three-way calling, and 77 percent bonus night and weekend minutes, unlimited calling, and voice activated dialing.²²⁵ CTIA makes a similar finding, saying that “mobile

²¹⁸ *Ninth Report*, at 20643; *Tenth Report*, at 15945.

²¹⁹ FCC analysis, using American Roamer, July 2007, and Census 2000 population figures.

²²⁰ *CTIA 2007 NOI Comments*, at 5.

²²¹ *CTIA 2007 NOI Comments*, at 5.

²²² *See 2006 NTCA Wireless Survey*.

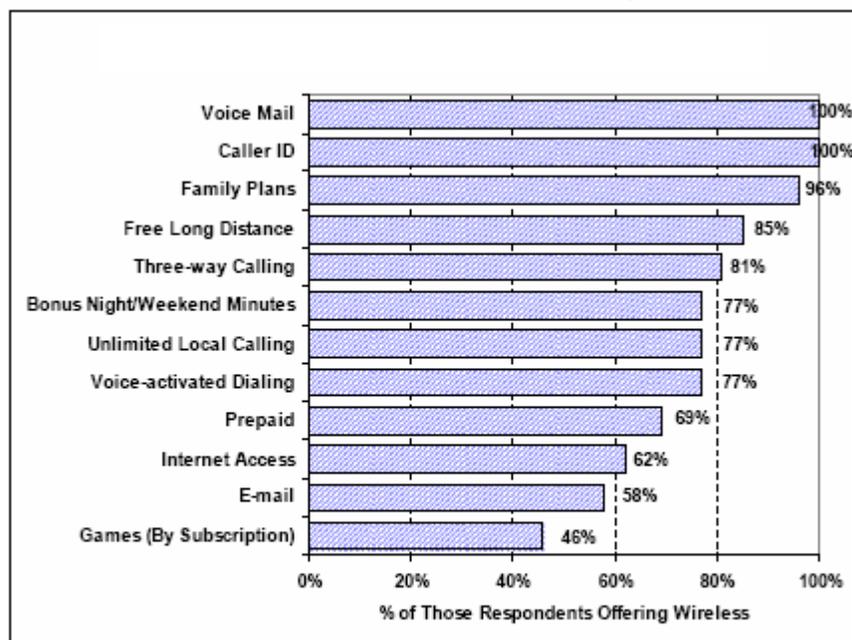
²²³ *Id.*, at 4.

²²⁴ *Id.*, at 7.

²²⁵ *Id.*, at 10.

wireless providers across the country – including providers in rural markets – are investing in expanding network capacity to deliver voice and advanced wireless services to consumers in rural areas and tribal lands.”²²⁶

Chart 2: Features Offered to Wireless Customers by NTCA Members²²⁷



Note: Totals exceed 100% as respondents may provide more than one wireless feature.

109. According to the NTCA survey, competition is strong in rural areas, with member providers “facing considerable competition from other carriers—the average respondent indicated that their company competes with between three and five other carriers.”²²⁸

3. Conclusion

110. Based on our rollout analysis, information and statements provided by commenters, and industry reports, we conclude that CMRS providers are competing effectively in rural areas. While it does appear that, on average, a modestly smaller number of operators are serving rural areas than urban areas, this structural difference is not, by itself, a sufficient basis for concluding that CMRS competition is not effective in rural areas. We note that market structure is only a starting point for a broader analysis of the status of competition based on the totality of circumstances, including the pattern of provider conduct, consumer behavior, and market performance as discussed more fully below. Despite the smaller number of mobile operators in rural areas as compared to urban areas, there is no evidence in the record to indicate that this structural difference has enabled providers in rural areas to raise prices above competitive levels or to alter other terms and conditions of service to the detriment of rural consumers. To the contrary, the NTCA survey found that rural providers are rolling out competitive national pricing plans: 70 percent of the NTCA survey respondents said they offered a wireless package that they feel is

²²⁶ *CTIA 2007 NOI Comments*, at 5.

²²⁷ *2006 NTCA Wireless Survey*, at 10.

²²⁸ *2006 NTCA Wireless Survey*, at 9.

competitive with those offered by nationwide providers.²²⁹

IV. PROVIDER CONDUCT IN THE MOBILE TELECOMMUNICATIONS MARKET

111. A concentrated market, in conjunction with significant entry barriers, may lessen competition in the market for commercial mobile services in two distinct ways. First, it may increase the likelihood that a group of competing providers will successfully engage in coordinated interaction aimed at raising prices and lowering output. Second, it may enable an individual provider to profitably raise price and lower output unilaterally. However, neither coordinated interaction nor unilateral action to lessen competition is a necessary consequence of market concentration and entry barriers. For example, unilateral or coordinated action to lessen competition may be thwarted or undermined by the presence of one or more maverick providers who have the ability and incentive to expand sales by undercutting the prices of rivals, offering innovative service packages and engaging in aggressive advertising and promotional campaigns.²³⁰ The analysis of provider conduct thus focuses on whether incumbent carriers, given the prevailing market structure, engage in intense price and non-price rivalry or instead compete in a less aggressive manner.

A. Price Rivalry

1. Developments in Mobile Telephone Pricing Plans

112. The continued rollout of differentiated pricing plans also indicates a competitive marketplace.²³¹ In the mobile telephone sector, we observe independent pricing behavior, in the form of continued experimentation with varying pricing levels and structures, for varying service packages, with various handsets and policies on handset pricing. Today all of the nationwide operators, and many smaller operators, offer some version of a national rate pricing plan in which customers can purchase a bucket of minutes to use on a nationwide or nearly nationwide network without incurring roaming or long-distance charges. A more recent example is the introduction and spread of “family plan” packages, in which subscribers sign up for two lines and then have the option of adding additional lines at reduced prices, with all lines sharing the available minutes on the plan jointly.²³² As noted in the *Tenth Report*, all the nationwide carriers also offer some version of a family plan.²³³

113. More recently, a number of operators have been experimenting with “unlimited” calling options. As discussed in the *Eleventh Report*, some U.S. providers, including Alltel (“My Circle”) and T-Mobile (“myFaves”),²³⁴ allow subscribers unlimited free calling to and from a small number of designated numbers, regardless of wireline or wireless carrier.²³⁵ Other providers offer plans that provide for free

²²⁹ *Id.*, at 10.

²³⁰ An example is when AT&T introduced its digital-one-rate plan in May 1998, which was the first plan to include a large quantity of monthly minutes at a fixed rate and no long distance charges when used on the operator’s network. See *Fourth Report*, at 10155, and *Fifth Report*, at 17677-78.

²³¹ See Section IV.B.6, Mobile Data Services and Applications, *infra*.

²³² See *Tenth Report*, at 15946. One analyst estimated that 54 percent of adult postpaid users, and 81% of all teens (13 to 17 years of age), were on a family plan in 2005. *Yankee Group Reveals Family and Prepaid Plans Continue to Drive Growth in the United States*, News Release, Yankee Group, June 12, 2006.

²³³ See *Tenth Report*, at 15946.

²³⁴ According to Robert Dotson, CEO and President of T-Mobile USA, “myFaves is the most successful offering we’ve had in the history of T-Mobile and it is changing the nature of our business. We continue to add high quality customers to our ranks and myFaves is a key reason why.” *T-Mobile USA Adds Almost 1 Million Net New Customers*, CELLULAR-NEWS.COM, Oct. 5, 2007.

²³⁵ *Eleventh Report*, at 10984.

calls only to customers who use the same wireless provider (“on-net” mobile-to-mobile options).²³⁶ A number of smaller and regional carriers, like Leap and MetroPCS, have been offering unlimited local calling plans for years.²³⁷ Now, first among the nationwide carriers, Sprint Nextel has begun offering unlimited calling plans, for a limited time, in select markets.²³⁸ As of May 2007, Sprint Nextel’s bundled plan, Unlimited Access Pack - consisting of unlimited wireless voice, text and data service - was available to residents of the Twin Cities, Philadelphia, San Francisco and Tampa, FL, for \$120 per month.²³⁹ The same bundle with unlimited broadband access (via network cards) is offered for \$150 per month.

114. While a relatively small number of users subscribe to unlimited calling plans today, one analyst predicts that as many as 20 percent of U.S. wireless users could move to such plans by 2010.²⁴⁰ Other analysts are less optimistic. One analyst pointed out that several carriers - including Alltel and US Cellular - have experimented with unlimited plans in the past, but all have eliminated them due to “network capacity, repricing of the base, and ARPU cannibalization issues.”²⁴¹

2. Early Termination Fees and Contract Terms

115. The *Tenth Report* noted that early termination fees (“ETFs”) are a widespread phenomenon in the marketplace.²⁴² In November 2006, Verizon Wireless became the first carrier to pro-rate ETFs for new contract customers.²⁴³ Now, a customer who signs up for or renews Verizon Wireless service will not be required to pay a fixed early termination fee if he or she chooses to terminate service before the end of the minimum term. Verizon Wireless’ contract termination fee starts at \$175, and will be reduced \$5 per month for each full month toward the contract’s term that the customer completes. One report suggested that Verizon Wireless’ new ETF policy may put competitive pressure on other providers to follow suit.²⁴⁴ In fact, in October 2007, AT&T announced that, beginning in early 2008, AT&T customers who choose to exit their contracts early will no longer be required to pay a flat early termination fee.²⁴⁵ Instead, that fee will be progressively lowered during the term of the contract.²⁴⁶ AT&T also announced that, beginning in November 2007, customers who change to any one of the company’s “standard wireless” calling plans during the course of their contract, or when they are adding or deleting features or services, will no longer be required to extend their current contract or enter into a new one.²⁴⁷ In November 2007, both Sprint Nextel and T-Mobile announced plans to implement prorated

²³⁶ *Id.*

²³⁷ See Section VII.A.2, *Wireless Alternatives, infra*, and *Tenth Report*, at 15981.

²³⁸ Tim Horan, *Sprint Trials Unlimited Wireless Bundle At \$120 Per Month*, DAILY DATATIMES -CIBC WORLD MARKETS, Mar. 19, 2007.

²³⁹ Tim Horan, *Sprint Expands Unlimited Plan Offers*, DAILY DATATIMES -CIBC WORLD MARKETS, May 18, 2007.

²⁴⁰ Olga Kharif, *Sprint's All-You-Can-Talk Offer*, BUSINESSWEEK.COM, Mar. 13, 2007 (citing Jerry Kaufman, president of wireless consultancy Alexander Resources).

²⁴¹ Marje Soova, *et al.*, *Leap Wireless International, Inc.*, Goldman Sachs, Equity Research, Jan. 9, 2007, at 1.

²⁴² See *Tenth Report*, at 15946.

²⁴³ *Verizon Wireless Expands the ‘Worry-Free Wireless Guarantee’ It Pioneered*, News Release, Verizon Wireless, Nov. 16, 2006.

²⁴⁴ *Citing Negative Impact on Industry, Verizon Wireless to Pro-Rate ETFs*, TRDAILY, June 29, 2006.

²⁴⁵ *AT&T Adds Two More Customer-Friendly Policies*, News Release, AT&T, Oct. 16, 2007.

²⁴⁶ *Id.* This policy will apply to new and renewing wireless customers who sign one- or two-year service agreements. *Id.*

²⁴⁷ *Id.*

ETFs in 2008.²⁴⁸ As of late 2007, AT&T, Verizon Wireless, Sprint Nextel, T-Mobile, and Alltel have all announced various policies that allow customers the option of changing elements of their contracts without requiring a contract extension.²⁴⁹

3. Prepaid Service

116. In the United States, most mobile telephone subscribers pay their phone bills after they have incurred charges, an approach known as postpaid service. Prepaid service, in contrast, requires customers to pay for a fixed amount of minutes prior to making calls. Although prepaid plans are considered a good way to increase penetration rates, they typically produce lower ARPUs and higher churn rates in comparison to postpaid service.²⁵⁰ For these reasons, the industry generally has not heavily promoted prepaid offerings in the past.²⁵¹ However, the pool of unsubscribed customers qualified for postpaid plans²⁵² has declined to the point where prepaid offerings, which do not require credit checks, seem more attractive to carriers.²⁵³ In response, some carriers have introduced new prepaid plans, or entire brands.²⁵⁴ In some cases, they are tailoring their offerings to suit segments of the market that do not want or cannot get a traditional cellular plan, particularly the youth market. In addition, many MVNOs offer prepaid plans rather than standard monthly billing.

117. The result of these efforts has been a significant rise in the percentage of wireless users who subscribe to prepaid plans.²⁵⁵ According to one analyst, prepaid accounted for roughly 15 percent of major U.S. operators' subscribers²⁵⁶ at the end of 2006, versus 13 percent at the end of 2005.²⁵⁷ According to another analyst's survey, 37 percent of the net subscriber adds in the fourth quarter of 2006 were

²⁴⁸ *T-Mobile to Introduce More-Flexible Contract Terms for Customers*, News Release, T-Mobile, Nov. 7, 2007; *Sprint Announces New Programs to Deliver Better Customer Experience*, News Release, Sprint Nextel, Nov. 7, 2007.

²⁴⁹ CTIA, In re: Annual Report and Analysis of Competitive Market Conditions With Respect to Commercial Mobile Services, WT Docket No. 07-71, *Written Ex Parte Communication*, Dec. 3, 2007, at 2.

²⁵⁰ Simon Flannery *et al.*, *Prepaid Takes Share in Quarterly Wireless Survey*, Morgan Stanley, Equity Research, Jan. 17, 2006, at 1; Tracfone Comments, at 2 ("Tracfone's average revenue per user (ARPU) is well below that of other CMRS operators"); Simon Flannery, *et al.*, *Survey Suggests Wireless Growth Remains Robust*, Morgan Stanley, Equity Research, July 14, 2006, at 17 (The prepaid offerings . . . generally show higher churn.)

²⁵¹ *See Eleventh Report*, at 10985.

²⁵² Only about 58 percent of the US population has prime credit. *Diamond in the Rough*, at 4. *See, also*, Roger Cheng, *Pre-Paid Customers Gain Traction With Wireless Carriers*, MarketWatch, Feb 22, 2006, at 1, citing Todd Rethemeier, an analyst for Soleil Securities Group ("We're running out of good customers in this industry. Do you know anyone who doesn't have a cellphone?").

²⁵³ Roger Cheng, *Pre-Paid Customers Gain Traction With Wireless Carriers*, MarketWatch, Feb 22, 2006, at 1 ("There's greater growth in prepaid," said Sprint Chief Financial Officer Paul Saleh. "That's what's happening in the market. It's really on a fast-growth pace." As a result, the big carriers have increasingly accepted higher credit risks and aggressively pursued the market.").

²⁵⁴ *See Eleventh Report*, at 10985.

²⁵⁵ The percentage of total mobile telephone subscribers who use prepaid plans remains significantly lower in the United States than in most of Western Europe. *See* Table 16: Mobile Market Structure and Performance, *infra*.

²⁵⁶ These carriers accounted for approximately 96 percent of all subscribers at the end of 2006. *See* David Janazzo *et al.*, *US Wireless Matrix 1Q07*, Merrill Lynch, Equity Research, May. 21, 2007, at 8 ("*US Wireless Matrix 1Q07*").

²⁵⁷ *US Wireless Matrix 1Q07*, at 17. In this analysis, the analyst has adjusted prepaid subscribers to include retail prepaid and reseller prepaid. He assumes reseller subscribers are primarily prepaid.

prepaid customers, compared to 27 percent in the fourth quarter of 2005.²⁵⁸ Among the nationwide carriers,²⁵⁹ T-Mobile had 15.7 percent of its subscribers on prepaid plans, AT&T Wireless had 13.7 percent, and Verizon Wireless had 6.7 percent.²⁶⁰

4. Mobile Data Pricing

118. In addition to making and receiving calls, mobile subscribers can use their cellphones to send text, photo, and video messages, download ringtones and games, browse news and information on web sites, use email, and access other content. During the past year providers continued to use a wide variety of options for pricing handset-based mobile data services that are marketed primarily as an add-on to mobile voice service.²⁶¹ These options include subscription to a monthly data package, flat rate pricing for each use or download of an application, and pricing based on kilobytes consumed. The availability of the different pricing options varies by type of application as well as by provider, with providers frequently offering customers a choice of pricing options for a particular application. In addition to allowing customers to purchase particular applications on a stand-alone or *a la carte* basis, carriers also offer certain applications bundled with monthly data packages for cellphones. As in the past, mobile data pricing continues to be characterized by considerable complexity due to the diversity of pricing options.²⁶²

119. Providers offer mobile subscribers a wide variety of monthly data packages with a recurring monthly fee. The specific content of such mobile data packages varies by provider, and individual providers typically offer multiple tiers of monthly data packages.²⁶³ Some monthly data packages set upper limits on the amount of data usage per month based on kilobytes consumed or the number of times an application is used, while others allow unlimited use of some or all applications.²⁶⁴ Providers also allow mobile subscribers to use mobile data applications on a “pay-per-use” or “pay-as-you-go” basis, without subscribing to a monthly data package. There are a variety of pay-per-use pricing options, including: (1) a flat fee for each use or download of an application;²⁶⁵ (2) a per-kilobyte fee;²⁶⁶

²⁵⁸ Simon Flannery *et al.*, *Robust Wireless Quarter as Prepaid Surges*, Morgan Stanley, Equity Research, Jan. 17, 2007, at 10.

²⁵⁹ Sprint Nextel does not offer prepaid plans under its own name, but markets prepaid offerings through its subsidiary brand, Boost Mobile.

²⁶⁰ *US Wireless Matrix 1Q07*, at 18. In this analysis, the analyst has adjusted prepaid subscribers to include retail prepaid and reseller prepaid. The analyst assumes reseller subscribers are primarily prepaid.

²⁶¹ *Eleventh Report*, at 10986.

²⁶² *Id.*

²⁶³ See, e.g., AT&T Wireless, *Messaging and MEdia Bundles* (visited June 5, 2007) <www.wireless.att.com>; Sprint, *Get Music, TV, Navigation and Messaging – Right on Your Phone* (visited June 5, 2007) <www.sprint.com>; Verizon Wireless, *V CAST Mobile TV Packages* (visited June 5, 2007) <www.verizonwireless.com>.

²⁶⁴ *Id.*

²⁶⁵ See, e.g., T-Mobile, *Services* (visited June 5, 2007) <www.t-mobile.com> (explaining that subscribers can download various types of games and ringtones for a range of flat fees apiece).

²⁶⁶ See, e.g., AT&T Wireless, *MEdia™ Net* (visited June 5, 2007) <www.wireless.att.com> (noting that the pricing options available for MEdia Net wireless data services include pay-as-you-go for \$0.01 per kilobyte); Sprint, *Get Music, TV, Navigation and Messaging – Right on Your Phone* (visited June 5, 2007) <www.sprint.com> (noting that customers will be charged \$0.03 per kilobyte for usage of Sprint Vision data services unless they purchase a monthly data plan for Sprint Vision or Power Vision).

and (3) deducting from a subscriber's monthly airtime allowance for purchasing and downloading an application.²⁶⁷ Some providers charge only a flat rate to download an application on a pay-as-you-go basis,²⁶⁸ while others apply kilobyte-based or airtime charges in addition to a flat rate per application.²⁶⁹

120. To encourage subscribers to purchase monthly data packages, providers offer various types of discounts on monthly data packages as compared to pay-as-you-go data usage. For example, customers may be able to avoid incurring kilobyte-based or airtime charges for downloading and using certain applications by subscribing to a monthly data package.²⁷⁰ In addition, the unit price of sending text messages (or "SMS") and multimedia messages with the purchase of monthly messaging packages is lower than the flat pay-as-you-go rate for such messaging services.²⁷¹ Another discount method is to offer a reduced flat rate per application to subscribers who purchase a monthly data package.²⁷² As noted in the *Eleventh Report*,²⁷³ Telephia Inc. ("Telephia") found that subscribers' propensity to purchase monthly data packages, as opposed to using mobile data applications on a pay-as-you-go basis, varies by type of application. For example, Telephia estimated that subscribers who access the Web via their cellphones are nearly twice as likely to subscribe to monthly data packages as to use a pay-per-use option.²⁷⁴ According to Telephia, this is because consumers perceive mobile web browsing to be too expensive without using monthly data packages, and want to avoid being surprised by additional charges billed to their monthly cellphone invoices. Similarly, Telephia estimated that MMS users are nearly three times as likely to subscribe to monthly MMS packages as to use the pay-per-use option.²⁷⁵ Among SMS users,

²⁶⁷ See, e.g., Verizon Wireless, *Answers to FAQs* (visited June 5, 2007) <www.verizonwireless.com> (explaining to subscribers that the minutes they use browsing in the Get It Now Shop for a data application and for downloading applications are applied to their monthly airtime allowance, and that if they exceed their allowance minutes while browsing and downloading, they will be charged the same rate as for voice minutes over their airtime allowance).

²⁶⁸ See, e.g., T-Mobile, *Services* (visited June 5, 2007) <www.t-mobile.com> (explaining that subscribers can download various types of games and ringtones for a range of flat fees apiece).

²⁶⁹ See, e.g., AT&T Wireless, *Games* (visited June 5, 2007) <www.wireless.att.com> (explaining that some games are charged as a one-time fee for unlimited use, while others are charged as a monthly subscription, and adding that standard data charges will also apply for the kilobytes used in downloading the game to the subscriber's phone); Verizon Wireless, *Answers to FAQs* (visited June 5, 2007) <www.verizonwireless.com> (indicating that subscribers pay per application at the time of download, with each application having a specific pricing option, and that airtime charges also apply while browsing for and downloading applications on their phone).

²⁷⁰ See, e.g., Sprint, *Get Music, TV, Navigation and Messaging – Right on Your Phone* (visited June 5, 2007) <www.sprint.com> (indicating that customers can avoid being charged \$0.03 per kilobyte for usage of Sprint Vision data services if they purchase a monthly data plan for Sprint Vision or Power Vision); Verizon Wireless, *V CAST Music* (visited June 5, 2007) <www.verizonwireless.com> (indicating that subscribers can avoid airtime charges when browsing, previewing, purchasing, and downloading songs using the V CAST Music application by purchasing a V CAST VPAK subscription).

²⁷¹ See, e.g., T-Mobile, *Services* (visited June 5, 2007) <www.t-mobile.com> (offering subscribers the option of purchasing volume-discount priced monthly messaging bundles as an alternative to sending and receiving messages on a pay-as-you-go basis for \$0.15 each).

²⁷² See, e.g., Sprint, *Get Music, TV, Navigation and Messaging – Right on Your Phone* (visited June 5, 2007) <www.sprint.com> (offering music track downloads for \$0.99 apiece with the purchase of a Sprint Power Vision monthly data package, and warning that customers not subscribed to Power Vision data plan will pay \$2.50 per full track download).

²⁷³ *Eleventh Report*, at 10987.

²⁷⁴ *Id.*

²⁷⁵ *Id.*

however, Telephia found that the pay-per-use option and monthly SMS packages were almost equally popular.²⁷⁶

121. One notable development in the pricing of mobile data services in the past year is a sequence of price cuts for over-the-air (“OTA”) music downloading services. The *Eleventh Report* noted that both Sprint Nextel and Verizon Wireless began offering their new OTA music downloading services on a pay-per-use basis for a flat rate per song.²⁷⁷ Sprint Nextel introduced the first OTA downloads of full music tracks in October 2005 for a price of \$2.50 per download, and Verizon responded in January 2006 by offering OTA downloads through its V-Cast music service at a lower rate of \$1.99 per song.²⁷⁸ More recently, Sprint Nextel cut its download fee to \$0.99 per song from April 2007, matching the prices of iTunes, the leading online music downloading service run by Apple Inc (“Apple”).²⁷⁹ The authors of a recent economic analysis argue that Sprint Nextel slashed its price for music downloads in anticipation of AT&T’s planned rollout of the Apple iPhone, and interpret this entire sequence of price undercutting for music downloads as an illustration of competitive forces at work.²⁸⁰

122. Advertising for cellphones has the potential to become a significant alternative to monthly subscriptions and other charges as a source of revenue from mobile data services. U.S. wireless providers are beginning to consider lowering the price of mobile video, web access and other content for cellphones, and thereby stimulating greater consumer usage of such mobile data services, by carrying cellphone ads.²⁸¹ Sprint Nextel began putting banner ads on some mobile web sites in the fall of 2006, and Verizon Wireless has announced its intention to do something similar.²⁸² AT&T has also announced plans to begin selling advertising on cellphones.²⁸³ In addition, Sprint Nextel has established an arrangement with Internet advertisement broker Ingenio, Inc. for a service that lets businesses bid to be listed when users type a keyword into a Sprint Nextel search application.²⁸⁴ Under this arrangement, advertisers pay only if a consumer clicks on the link to call them, an advertising business model termed “pay per call.”²⁸⁵ Alltel recently made a similar search advertising deal with a start-up called JumpTap,

²⁷⁶ *Id.*

²⁷⁷ *Id.*, at 10988.

²⁷⁸ Marius Schwartz and Federico Mini, *Hanging up on Carterfone: The Economic Case Against Access Regulation in Mobile Wireless*, May 2, 2007, at 8 (“*Economic Case Against Access Regulation*”).

²⁷⁹ *Id.*, at 8-9. As previously noted, the reduced fee of \$0.99 per song is offered to customers who subscribe to a Sprint Power Vision monthly data plan; customers not subscribed to a Power Vision data plan will pay \$2.50 per full track download. See Sprint, *Get Music, TV, Navigation and Messaging – Right on Your Phone* (visited June 5, 2007) <www.sprint.com>. See also Walter S. Mossberg, *Latest Music Phone Is a Creative Gadget Marred by Big Flaws*, WALL STREET JOURNAL, Mar. 29, 2007 (noting that Sprint is slashing the price of songs sold on its proprietary music service from \$2.49 each to just 99 cents, although the customer has to pay an additional fee each month for a subscription to a monthly data package for the privilege of paying 99 cents per song).

²⁸⁰ *Economic Case Against Access Regulation*, at 8-9.

²⁸¹ Amol Sharma, *What’s New in Wireless*, WALL STREET JOURNAL, Mar. 26, 2007, at R1 (“*What’s New in Wireless*”).

²⁸² Amol Sharma, *Companies Vie For Ad Dollars On Mobile Web*, WALL STREET JOURNAL, Jan. 17, 2007, at A1 (“*Companies Vie For Ad Dollars On Mobile Web*”); Amol Sharma and Almar Latour, *AT&T Plans Push in Wireless, Ads*, WALL STREET JOURNAL, Jan. 2, 2007, at A3 (“*AT&T Plans Push in Wireless, Ads*”).

²⁸³ *AT&T Plans Push in Wireless, Ads*.

²⁸⁴ *Companies Vie For Ad Dollars On Mobile Web*.

²⁸⁵ *Id.*

Inc.²⁸⁶ One uncertainty surrounding the advertising model is how receptive consumers are to being subjected to marketing on cellphones in exchange for receiving free applications.²⁸⁷ In a survey conducted in August 2006 asking participants “How willing would you be [on a scale of 1 to 7] to watch advertising on your cellphone if in return you were to receive free applications for your cellphone?,” 51 percent responded that they were not willing at all [rating 1], 12 percent were neutral [4], and only 10 percent responded that they were very willing [7].²⁸⁸

123. Aside from handset-based applications, providers offer monthly mobile Internet access packages for data users who access the Internet through laptops or Personal Digital Assistants (“PDAs”). The nationwide carriers continue to price mobile Internet access packages in two principal ways: based on a set amount of megabytes per month or unlimited monthly data use.²⁸⁹ As noted in previous reports, under the megabyte-based pricing scheme, the monthly rate per package increases with the amount of megabytes included in the package, but the volume discounts provided by larger packages result in a progressively lower price per megabyte.²⁹⁰

B. Non-Price Rivalry

124. Service providers in the mobile telecommunications market also compete on many more dimensions other than price, including non-price characteristics such as coverage, call quality, data speeds, and mobile data content. Indicators of non-price rivalry include advertising and marketing, capital expenditures, technology deployment and upgrades, and the provision of mobile data services.

1. Technology Deployment and Upgrades

a. Market-Based Versus Mandated Standards

125. The subject of technology deployment and upgrades by U.S. mobile telecommunications providers is properly analyzed under the heading of provider conduct because of the Commission’s market-oriented approach to managing spectrum for commercial mobile voice and data services. The Commission has adopted flexible licensing policies instead of mandating any particular technology or network standard. Mobile telephone service providers have the flexibility to deploy the network technologies and services they choose as long as they abide by certain technical parameters designed to avoid radiofrequency interference with adjacent licensees. In contrast, the European Community mandated a single harmonized standard for second-generation mobile telecommunications services (GSM²⁹¹), and has also adopted a single standard for third-generation services (WCDMA²⁹²).²⁹³ As a

²⁸⁶ *Id.*

²⁸⁷ *Id.*; *AT&T Plans Push in Wireless, Ads.*

²⁸⁸ *Companies Vie For Ad Dollars On Mobile Web.*

²⁸⁹ See, e.g., AT&T Wireless, *Data Plan Comparison Chart* (visited June 6, 2007) <www.wireless.att.com>; Sprint, *Mobile Broadband Connection Plans* (visited June 6, 2007) <www.sprint.com>; T-Mobile, *Internet & E-mail Plans* (visited June 6, 2007) <www.t-mobile.com>; Verizon Wireless, *Wireless PC Card Plans* (visited June 6, 2007) <www.verizonwireless.com>.

²⁹⁰ *Ninth Report*, at 20648.

²⁹¹ See Section IV.B.1.b, Background on Network Design and Technology, *infra*.

²⁹² *Id.*

²⁹³ Neil Gandal, David Salant, and Leonard Waverman, *Standards in Wireless Telephone Networks*, TELECOMMUNICATIONS POLICY, Vol. 27, 2003 (“*Standards in Wireless Telephone Networks*”). The authors note that, although the European Community backed away from mandating a single standard for third-generation (continued....)

result of the flexibility afforded by the Commission's market-based approach, different U.S. providers have chosen to deploy a variety of different technologies with divergent technology migration paths, and competition among multiple incompatible standards has emerged as an important dimension of non-price rivalry in the U.S. mobile telecommunications market and a distinctive feature of the U.S. mobile industry model.

126. The main advantage of compatibility between competing wireless networks is that greater economies of scale in the production of both terminals and network infrastructure equipment tend to lower the unit cost of handsets, chipsets, and other network equipment.²⁹⁴ Lower equipment costs, in turn, may promote more rapid adoption of mobile telephone services.²⁹⁵ In addition, standardization tends to produce greater variety of handsets.²⁹⁶ However, it has been argued that the Commission's market-based approach to wireless network standards helped encourage the emergence of a promising new wireless network technology (CDMA²⁹⁷) that ultimately proved to be superior to the European second-generation wireless standard for high-speed mobile data services.²⁹⁸ In addition, competition between mobile telephone providers using incompatible wireless network technologies has other advantages that can benefit consumers, including greater product variety and differentiation of services,²⁹⁹ more technological competition,³⁰⁰ and greater price competition.³⁰¹

127. The following analysis of technology deployment and upgrades is divided into four parts. (Continued from previous page) _____
services, the absence of a mandate has had little practical effect as all European mobile operators have opted for the same standard and migration path. *Id.*, at 330.

²⁹⁴ *Id.*, at 329.

²⁹⁵ See Carl Shapiro and Hal R. Varian, *Information Rules*, Harvard Business School Press, 1999, at 264 (noting that "the Europeans managed to adopt new digital wireless telephone technology more rapidly than in the United States") ("*Information Rules*"); Stephen C. Littlechild, *Mobile Termination Charges: Calling Party Pays Versus Receiving Party Pays*, TELECOMMUNICATIONS POLICY, Vol. 30, No. 5-6, June-July 2006, at 242-277, at 17-18 (finding that "technical concentration," measured as the percent of subscribers on GSM networks, increases mobile penetration).

²⁹⁶ *Standards in Wireless Telephone Networks*, at 329.

²⁹⁷ See Section IV.B.1.b, Background on Network Design and Technology, *infra*.

²⁹⁸ *Standards in Wireless Telephone Networks*, at 328-330; *Information Rules*, at 264; Section IV.B.1.b, Background on Network Design and Technology, *infra*.

²⁹⁹ *Standards in Wireless Telephone Networks*, at 329-330 (noting, for example, that CDMA networks "have offered more and better data services than were available on GSM networks").

³⁰⁰ *Id.*, at 330. See also, *Eleventh Report*, at 10993 (noting that the former Cingular was pressured to upgrade its network to WCDMA/HSDPA, rather than the slower, interim WCDMA technology, in an effort to compete with Verizon Wireless's EV-DO network, which offers speeds similar to WCDMA/HSDPA and faster than WCDMA) and 11025-11026 (arguing that this technological competition helped give the United States an edge over Europe with regard to the deployment of high-speed wireless data networks).

³⁰¹ *Standards in Wireless Telephone Networks*, at 330. Technological competition may pressure providers to cut rates and provide larger handset subsidies to attract a sufficiently large customer base to ensure their chosen technology survives as a standard. See Simon Flannery *et al.*, *3G Economics a Cause for Concern*, Morgan Stanley, Equity Research, Feb. 1, 2005, at 11 ("*3G Economics a Cause for Concern*"). In addition, use of multiple incompatible wireless network standards may act as a constraint on providers' ability to engage in explicit or tacit coordination that would impair price competition. See Horizontal Merger Guidelines, U.S. Department of Justice and Federal Trade Commission, Apr. 2, 1992, revised Apr. 8, 1997, § 2.11 (noting that standardization of pricing and product variables on which firms could compete may facilitate reaching terms of coordination that would harm consumers).

As background to examining the particular technological choices made by different providers, Section IV.B.1.b provides an introduction to cellular network design and technology and identifies and describes the major digital technologies and associated migration paths. Section IV.B.1.c examines the specific technological choices made by mobile providers that use the same spectrum bands, network design and technologies to offer both voice and data services. Section IV.B.1.d examines the impact of these choices on coverage by technology type. Finally, Sections IV.B.1.e and IV.B.1.f examine the technology deployment decisions of broadband and narrowband data network operators, respectively.

b. Background on Network Design and Technology

128. Cellular, PCS, and digital SMR networks use the same basic design. All use a series of low-power transmitters to serve relatively small areas (“cells”), and reuse spectrum to maximize efficiency.³⁰² In the past, cellular and SMR networks used an analog technology, while PCS networks were designed from the start to use a digital format. Digital technology provides better sound quality and increased spectral efficiency than analog technology. From a customer’s perspective, digital service in the cellular band or SMR bands is virtually identical to digital service in the PCS band. Digital technology is now dominant in the mobile telephone sector, with almost all wireless subscribers using digital service.³⁰³

129. The two main digital technologies used in the United States are Code Division Multiple Access (“CDMA”) and Global System for Mobile Communications (“GSM”). In addition, there are two other, less-widely used (by subscribers), technologies: integrated Digital Enhanced Network (“iDEN”) and the once-common Time Division Multiple Access (“TDMA”). These four technologies are commonly referred to as Second Generation, or “2G,” because they succeeded the first generation of analog cellular technology, Advanced Mobile Phone Systems (“AMPS”).³⁰⁴ As discussed in previous reports, in light of industry developments, this report no longer distinguishes between TDMA and GSM networks in its analysis of digital coverage, but considers the two as one migration path towards more advanced digital capabilities. U.S. carriers are in the process of phasing out TDMA.³⁰⁵ Maps showing mobile telephone digital coverage can be found in Appendix B.

130. Beyond the 2G digital technologies, mobile telephone providers have been deploying

³⁰² PCS, digital SMR, and cellular networks are all “cellular” systems since all divide service regions into many small areas called “cells.” Cells can be as small as an individual building or as large as 20 miles across. Each cell serves as a base station for mobile users to obtain connection to the fixed network and is equipped with its own radio transmitters/receivers and associated antennas. Service regions are divided into cells so that individual radio frequencies may be reused in different cells (“frequency reuse”), in order to enhance frequency efficiency. When a person makes a call on a wireless phone, the connection is made to the nearest base station, which connects with the local wireline phone network or another wireless operator. When a person is using a wireless phone and approaches the boundary of one cell, the wireless network senses that the signal is becoming weak and automatically hands off the call to the base station in the next cell. *See Sixth Report*, at 13361, note 55.

³⁰³ *See* Section VI.B.1, Subscriber Growth, *infra*.

³⁰⁴ *See* note 315, *infra*, for a discussion of the cellular analog requirement and its sunset.

³⁰⁵ AT&T, for example, is planning to discontinue TDMA service by early 2008. Only about 1 percent of AT&T’s traffic runs on its TDMA network, and customers who want to switch to another carrier can do so without termination fees. Tim Horan, *AT&T to Shut Down 18 TDMA Markets by July 15th*, CIBC WORLD MARKETS DATATIMES, Jun. 22, 2007. Only 780,000 TDMA customers remain, with two-thirds of those being wholesale. *Record Wireless Subscriber Increase Drives AT&T Third Quarter*, COMMUNICATIONS DAILY, Oct. 24, 2007, at 10. Cincinnati Bell Wireless discontinued its TDMA network in June 2006. Cincinnati Bell, Inc., SEC Form 10-K, filed Mar. 1, 2007, at 5.

next-generation network technologies³⁰⁶ that allow them to offer mobile data services at higher data transfer speeds and, in some cases, to increase voice capacity.³⁰⁷ For GSM/TDMA providers, the first step in the migration to next-generation network technologies is General Packet Radio Service (“GPRS” or “GSM/GPRS”), a packet-based data-only network upgrade that allows for faster data rates by aggregating up to eight 14.4 kbps channels.³⁰⁸ Beyond GPRS, many U.S. GSM/TDMA providers have deployed Enhanced Data Rates for GSM Evolution (“EDGE”) technology, which offers average data speeds of 100-130 kbps. Wideband CDMA (“WCDMA,” also known as Universal Mobile Telecommunications System, or “UMTS”) is the next migration step for GSM providers beyond EDGE and allows maximum data transfer speeds of up to 2 Mbps and average user speeds of 220-320 kbps.³⁰⁹ Finally, deployment of WCDMA with HSDPA (High Speed Data Packet Access) technology allows average download speeds of 400-700 kbps with burst rates of up to several Mbps.³¹⁰ Although WCDMA and WCDMA/HSDPA are not backwards compatible with GPRS/EDGE, wireless modem cards that are compatible with both WCDMA/HSDPA and GPRS/EDGE, and enable handoff between the two types of networks, are available for use with laptop computers.³¹¹

131. Many CDMA providers have upgraded their networks to CDMA2000 1xRTT (also referred to as “CDMA2000 1X” or “1xRTT”), CDMA2000 EV-DO (evolution-data optimized, “EV-DO”) Revision 0, and EV-DO Revision A (“Rev. A”) technologies. 1xRTT doubles voice capacity and delivers peak data rates of 307 kbps in mobile environments and typical speeds of 40-70 kbps.³¹² EV-DO allows maximum data throughput speeds of 2.4 Mbps, while EV-DO Rev. A increases maximum data throughput speeds to 3.1 Mbps.³¹³ Whereas WCDMA and WCDMA/HSDPA are incompatible with earlier technologies on the GSM migration path, the more advanced technologies on the CDMA migration path are backwards compatible.³¹⁴ Deployment of these various technologies is discussed below. Maps showing CDMA and GSM network coverages, as well as Mobile Broadband coverage, can be found in Appendix B.

c. Technology Choices and Upgrades of Mobile Telephone Providers

132. Of the four nationwide mobile telephone operators, AT&T and T-Mobile use

³⁰⁶ For purposes of this report, all of the network technologies beyond 2G that carriers have deployed, as well as those that they plan to deploy in the future, are generally referred to as “next-generation network technologies.” The International Telecommunication Union (“ITU”) has defined 3G network technologies as those that can offer maximum data transfer speeds of 2 megabits per second (“Mbps”) from a fixed location, 384 kbps at pedestrian speeds, and 144 kbps at traveling speeds of 100 kilometers per hour. *See Fifth Report*, at 17695. There is ambiguity among other industry players, however, as to which network technologies constitute 3G and which constitute interim technologies, often labeled “2.5G.” *See Seventh Report*, at 12990 and 13038. Therefore, this report uses a more general label to describe all of the technologies beyond 2G.

³⁰⁷ *See* Section IV.B.1.c, Technology Choices and Upgrades of Mobile Telephone Providers, *infra*.

³⁰⁸ *See Seventh Report*, at 12990. This upgrade is also labeled GSM/GPRS because many GSM/TDMA carriers are upgrading their TDMA markets with GSM and GPRS simultaneously.

³⁰⁹ *Tenth Report*, at 15951.

³¹⁰ *Id.*

³¹¹ *See, e.g.*, Novatel Wireless, *Products: Merlin U730 Wireless PC Modem Card* (visited May 12, 2006) <www.novatelwireless.com>.

³¹² *See Seventh Report*, at 12990; *Ninth Report*, at 20650.

³¹³ *Id.*

³¹⁴ *Standards in Wireless Telephone Networks*, at 328.

GSM/TDMA as their 2G digital technology, Verizon Wireless and Sprint Nextel use CDMA, and Sprint Nextel also uses iDEN on the former Nextel network.³¹⁵ The four nationwide mobile operators, together with other U.S. mobile providers, have continued to deploy next-generation network technologies over the past year.

133. The two nationwide CDMA operators, Verizon Wireless and Sprint Nextel, have deployed EV-DO and EV-DO Rev. A network technologies across portions of their networks.³¹⁶ Typical, user-experienced download speeds with EV-DO range from 400 to 700 kbps, while upload speeds average 50-70 kbps.³¹⁷ The EV-DO Rev. A network upgrade increases average download speeds to 600 kbps to 1.4 Mbps and significantly improves average upload speeds to 350-800 kbps.³¹⁸

134. Since October 2003, Verizon Wireless has launched EV-DO technology in areas of the country covering approximately 210 million people.³¹⁹ In June 2007, Verizon Wireless announced that it had upgraded all of this EV-DO network footprint with EV-DO Rev. A technology.³²⁰ With the EV-DO service, subscribers can access the Internet while mobile via a wireless modem card connected to a laptop computer or PDA, or they can download a range of multimedia content and advanced applications on certain mobile handset models. All of the devices sold by Verizon Wireless at the end of 2006 were 1xRTT compatible, and many were EV-DO compatible.³²¹ As of July 2007, Verizon Wireless was selling EV-DO Rev. A-compatible laptop cards but had not yet made EV-DO Rev. A-compatible handsets commercially available. Verizon Wireless has also stated that it plans to use its AWS licenses for the provision of “advanced wireless broadband services.”³²² In November 2007, the company announced that

³¹⁵ In addition, through February 18, 2008, all operators using cellular spectrum must deploy AMPS, an analog technology, throughout the part of their networks using cellular spectrum. See 47 C.F.R. §§ 22.901, 22.933. In 2002, the Commission decided to eliminate the requirement after a five-year transition period, which ends February 18, 2008. Year 2000 Biennial Regulatory Review – Amendment of Part 22 of The Commission’s Rules to Modify or Eliminate Outdated Rules Affecting The Cellular Radiotelephone Service and Other Commercial Mobile Radio Services, *Report and Order*, 17 FCC Rcd 18401, 18414 (2002).

³¹⁶ The Commission noted in the *Ninth Report* that Sprint Nextel altered its technology upgrade strategy in response to competitive pressures from Verizon Wireless by deploying EV-DO rather than waiting for a successor technology to become commercially available. See *Ninth Report*, at 20653.

³¹⁷ *Sprint Powers Up Faster Mobile Broadband Network in 10 More Markets, Upgraded Coverage Reaches 60 Million People*, News Release, Sprint Nextel, Dec. 12, 2006; 3G Americas, *3G Technologies* (visited July 3, 2006), <http://www.3gamericas.com/English/PDFs/3G_technology_comparison.pdf> (“3G Technology Comparison”). The maximum peak download speed for EV-DO is 2.4 Mbps. *Id.*

³¹⁸ *America’s Largest and Fastest Mobile Broadband Network Just Got Even Larger – Sprint Customers Can Do More, In More Places, And At Fast Speeds*, News Release, Sprint Nextel, June 19, 2007; *Verizon Wireless: 100 Percent of Wireless Broadband Network Now Enhanced with Faster Speeds*, News Release, Verizon Wireless, June 29, 2007. The maximum peak download speed for EV-DO Rev A is 3.1 Mbps. *3G Technology Comparison*.

³¹⁹ *Verizon Wireless: 100 Percent of Wireless Broadband Network Now Enhanced with Faster Speeds*, News Release, Verizon Wireless, June 29, 2007. Verizon Wireless has also deployed 1xRTT technology throughout “virtually all” of its network. Verizon Wireless, SEC Form 10-K, filed Mar. 1, 2007, at 5; *Eleventh Report*, at 10992. When EV-DO subscribers travel to other parts of the country where EV-DO networks have not been deployed, they can seamlessly roam on and access Verizon Wireless’s 1xRTT network because the more advanced technologies on the CDMA migration path are backwards compatible. See *Ninth Report*, at 20652.

³²⁰ *Verizon Wireless: 100 Percent of Wireless Broadband Network Now Enhanced with Faster Speeds*, News Release, Verizon Wireless, June 29, 2007.

³²¹ Verizon Wireless, SEC Form 10-K, filed Mar. 1, 2007, at 6.

³²² Verizon Wireless, SEC Form 10-K, filed Mar. 1, 2007, at 13.

it plans to deploy Long Term Evolution (“LTE”) as its Fourth Generation, or “4G,” network technology, with trials beginning in 2008.³²³ LTE will allow faster data rates, lower latency, and global roaming in countries where Vodafone operates.³²⁴

135. At the end of 2006, Sprint Nextel’s EV-DO network covered 209 million people in 219 communities with populations over 100,000.³²⁵ As of June 2007, Sprint Nextel had deployed EV-DO Rev. A in markets covering 203 million people, and the company plans to upgrade its entire CDMA network to EV-DO Rev. A by the end of 2007.³²⁶ In addition to offering Sprint-branded wireless services over its CDMA network, Sprint Nextel continues to provide Nextel-branded and Boost Mobile prepaid wireless services over the former Nextel iDEN network.³²⁷ Sprint Nextel’s iDEN network provides service in over 300 metropolitan markets in the U.S. and covers approximately 164 million people.³²⁸ In order to offer customers the benefits of both of its networks, and to relieve capacity constraints on its iDEN network, Sprint Nextel has introduced dual-mode handsets that operate on both the CDMA and iDEN platforms.³²⁹

136. Apart from the two near-nationwide CDMA mobile providers, some of the regional CDMA operators have also begun to deploy EV-DO, including Alltel, Alaska Communications Systems, and Cellular South.³³⁰ At the end of 2006, Alltel had deployed EV-DO to 56 percent of its POPs, or approximately 44 million people, and 1xRTT to 94 percent of its POPs, or approximately 74 million people.³³¹

137. At the time of the *Eleventh Report*, AT&T had launched WCDMA/HSDPA technology in 16 cities across the United States.³³² Since that time, AT&T has expanded its WCDMA/HSDPA network to more than 160 markets, including most of the top 100 cities in the United States.³³³

³²³ *Verizon Selects LTE as 4G Wireless Broadband Direction*, News Release, Verizon Wireless, Nov. 29, 2007.

³²⁴ *Id.*

³²⁵ Sprint Nextel, SEC Form 10-K, filed Mar. 1, 2007, at 4 (“*Sprint Nextel 2006 10K*”). Sprint Nextel has also deployed 1xRTT across its entire CDMA network footprint. As noted in the *Ninth Report*, Sprint altered its technology strategy by deploying EV-DO, rather than waiting for a successor technology to become commercially available, in response to competitive pressure from Verizon Wireless’s deployment of EV-DO. *Ninth Report*, at 20652-20653.

³²⁶ *America’s Largest and Fastest Mobile Broadband Network Just Got Even Larger – Sprint Customers Can Do More, In More Places, And At Fast Speeds*, News Release, Sprint Nextel, June 19, 2007; *Sprint Nextel 2006 10K*, at 4.

³²⁷ *Sprint Nextel 2006 10K*, at 1.

³²⁸ *Sprint Nextel 2006 10K*, at 8; Table 10: Mobile Telephone Digital Coverage by Census Block, *infra*.

³²⁹ *Sprint Nextel 2006 10K*, at 4.

³³⁰ *See Eleventh Report*, at 10993.

³³¹ Alltel, SEC Form 10-K, filed Feb. 20, 2007, at 2; *4Q06 Wireless 411*, at 20.

³³² *Eleventh Report*, at 10993. As noted in the *Tenth Report*, it has been reported that Cingular decided to upgrade its network to WCDMA/HSDPA, rather than the slower, interim WCDMA technology, in an effort to compete with Verizon Wireless’s EV-DO network, which offers speeds similar to WCDMA/HSDPA and faster than WCDMA. *See Tenth Report*, at 15953.

³³³ *Cingular Wireless Completes \$86 Million Investment in Las Vegas During 2006 – Delivers Wireless Innovation*, News Release, Cingular Wireless, Jan. 30, 2007. As noted in the *Tenth Report*, prior to its merger with AT&T Wireless Cingular had deployed GSM/GPRS technology across its entire network footprint and had upgraded its data network to EDGE with respect to two-thirds of its covered network POPs. *See Tenth Report*, at 15953, note (continued....)

WCDMA/HSDPA enables mobile broadband access at average user download speeds of 400-700 kbps. AT&T's WCDMA/HSDPA customers can access the Internet while mobile via a laptop computer or PDA with a wireless modem card, or they can download a range of multimedia content and advanced applications on certain mobile handset models.³³⁴ AT&T plans to continue deploying WCDMA/HSDPA throughout a majority of the U.S. markets covered by its network.³³⁵

138. T-Mobile has a nationwide EDGE network and has announced plans to deploy a 3G next-generation network using the spectrum licenses it acquired in the FCC's 2006 AWS-1 auction.³³⁶ T-Mobile's bundled CMRS/Wi-Fi voice and data services are discussed in detail below.³³⁷

d. Coverage by Technology Type

139. As we did with the number of mobile telephone operators, in this report, we further refine our examination of competition in the mobile telephone sector by compiling a list of census blocks where operators offer digital and next generation technologies. This analysis is performed through a contract with American Roamer, an independent consulting firm that tracks service provision for mobile voice and mobile data services.³³⁸ Under the American Roamer contract, in this report we are able to estimate in which of the roughly 8 million census blocks each provider offers services using digital and next generation technologies, compared to just the roughly 3,200 counties in previous reports. As discussed earlier, by utilizing such a relatively small area to analyze technological availability, census blocks eliminate, to a large degree, the concerns regarding overcounting populations and geographic areas.

140. As of July 2007, virtually the entire population of the United States live in census blocks where operators offer digital mobile telephone service, using CDMA, GSM/TDMA, or iDEN (including their respective next generation technologies), or some combination of the three.

(Continued from previous page) _____

274. As of the end of 2005, more than 86% of Cingular's subscriber base was equipped with GSM/GPRS devices. Cingular Wireless, SEC Form 10-K, filed Feb. 24, 2006, at 9.

³³⁴ *Eleventh Report*, at 10994. In markets where WCDMA/HSDPA is not available, laptop modem cards that are compatible with both WCDMA/HSDPA and GPRS/EDGE will seamlessly fall back to AT&T's EDGE and GPRS networks, albeit at lower speeds. *Eleventh Report*, at 10994.

³³⁵ AT&T, SEC Form 10-K, Exhibit 13, filed Mar. 1, 2007, at 19.

³³⁶ *Eleventh Report*, at 10994; *T-Mobile USA Secures Rights from FCC for Auctioned Spectrum*, News Release, T-Mobile, Nov. 30, 2006.

³³⁷ See Section VII.B, Wireless Local Area Networks and Wireless-Wireline Convergence, *infra*.

³³⁸ See www.americanroamer.com.

Table 10: Mobile Telephone Digital Coverage by Census Block

Technology	POPs in Covered Blocks	% of Total POPs	Square Miles Contained in Those Blocks	% of Total Square Miles
CDMA	279,883,825	98.1%	2,124,475	55.9%
GSM / TDMA	280,350,144	98.3%	2,171,209	57.1%
iDEN	163,637,650	57.4%	151,426	4.0%
Total Digital	283,961,584	99.6%	2,541,139	66.9%

Source: Federal Communications Commission estimates based on data supplied by American Roamer, July 2007.
Notes: POPs are from the 2000 Census, and the square miles include the United States and Puerto Rico.

141. Both CDMA and GSM/TDMA have been launched in census blocks containing 280 million people, or roughly 98 percent of the U.S. population, while iDEN-based service is available in census blocks containing roughly 164 million people, or approximately 57 percent of the U.S. population.

142. Using data supplied by American Roamer from May 2007, we have also calculated the extent of next generation deployment.

Table 11: Mobile Telephone NextGen Coverage by Census Block

Technology	POPs in Covered Blocks	% of Total POPs	Square Miles Contained in Those Blocks	% of Total Square Miles
CDMA Path (1xRTT/EV-DO/EV-DO Rev. A)	279,883,825	98.1%	2,124,475	55.9%
GSM Path (GPRS/EDGE/WCDMA/HSDPA)	280,350,144	98.3%	2,171,209	57.1%
Total NextGen	283,954,869	99.6%	2,540,956	66.9%
WCDMA/HSDPA	121,328,725	42.5%	83,429	2.2%
EV-DO/EV-DO Rev. A	232,549,906	81.5%	723,475	19.0%
Total Broadband (EV-DO/WCDMA)	233,817,479	82.0%	729,642	19.2%

Source: Federal Communications Commission estimates based on data supplied by American Roamer, May 2007.
Notes: POPs are from the 2000 Census, and the square miles include the United States and Puerto Rico.

143. CDMA 1xRTT and/or EV-DO, has been launched in census blocks containing 280 million people, or roughly 98 percent of the U.S. population. Similarly, GPRS, EDGE, and/or WCDMA/HSDPA has been launched in census blocks containing 280 million people, or about 98 percent of the U.S. population. EV-DO is now available in census blocks containing 82 percent of the U.S. population, covering 19 percent of the total square miles of the US, while WCDMA/HSDPA is available in census blocks containing 43 percent of the U.S. population, but representing only 2 percent of its land area.

144. We also calculated the number of mobile broadband providers competing to offer service by census block.

**Table 12: Estimated Mobile Broadband Providers
by Census Block**

Total Number of Providers in a block	Number of Blocks	POPs Contained in Those Blocks	% of Total US POPs	Square Miles Contained in Those Blocks	% of Total US Square Miles
1 or More	4,694,827	233,817,479	82.0%	729,642	19.2%
2 or More	2,880,135	183,774,878	64.0%	209,964	5.5%
3 or More	1,664,014	118,248,249	41.0%	75,831	2.0%

Source: Federal Communications Commission estimates based on data supplied by American Roamer, May 2007 (EV-DO/HSDPA Coverage). Notes: POPs are from the 2000 Census, and the square miles include the United States and Puerto Rico.

145. Roughly 184 million people, or 64 percent of the U.S. population, live in census blocks with two or more mobile telephone operators offering EV-DO or WCDMA/HSDPA technologies, while 118 million people, or 41 percent of the U.S. population, live in census blocks where three or more operators offer such technologies.

e. Broadband Data Networks and Technology Deployment

146. In addition to the EV-DO and WCDMA/HSDPA mobile broadband network deployments discussed above, wireless operators in the 2.5 GHz BRS/EBS and 2.3 GHz WCS spectrum have begun rolling out, or have announced plans to deploy, wireless broadband services using Orthogonal Frequency Division Multiplexing (“OFDM”) technologies, including Worldwide Interoperability for Microwave Access (“WiMAX”) and similar technologies. Because OFDM allows signals to pass through buildings and trees, providers can use the technology to offer wireless broadband services without a direct line-of-sight between the transmitter and the end user’s receiver.³³⁹ Many of the services offered using OFDM technology allow customers to access the Internet with portable, “plug-and-play” modem devices connected to a personal or laptop computer, rather than a fixed antenna mounted on a rooftop. Customers can transport these devices to other locations within the provider’s coverage area where a network signal is available and in some cases use them while traveling at high speeds.³⁴⁰

147. Clearwire offers wireless high-speed Internet access and VoIP services using OFDM and Time Division Duplex (“TDD”) technology, and spectrum in the 2.5 GHz BRS/EBS band. As of June 2007, the company had launched broadband service in 39 markets, mainly smaller towns and cities, covering approximately 10 million people in portions of 13 U.S. states.³⁴¹ In 14 of those markets, Clearwire was offering in-home VoIP telephone service for an additional monthly fee. As of June 30, 2007, the company had 270,000 broadband subscribers.³⁴² Clearwire’s customers can access the Internet at downstream speeds ranging from 768 kbps to 1.5 Mbps, and upstream speeds around 256 kbps, using a

³³⁹ *Eleventh Report*, at 10995.

³⁴⁰ *Eleventh Report*, at 10995.

³⁴¹ *Richmond First in Virginia to Experience Clearwire Wireless Broadband Service*, News Release, Clearwire, June 5, 2007.

³⁴² Clearwire, SEC Form 10-Q, filed Aug. 9, 2007, at 18.

portable wireless modem device that connects to a desktop or laptop computer.³⁴³

148. In June 2007, Clearwire announced a partnership with Direct Broadcast Satellite (“DBS”) companies, DIRECTV and EchoStar, in which the satellite companies will offer Clearwire’s Internet access service to their customers, and Clearwire will sell DBS video services to its broadband subscribers.³⁴⁴

149. In July 2007, Clearwire and Sprint Nextel announced a partnership in which the two companies planned to jointly construct a nationwide mobile WiMAX IEEE 802.16e-2005 network using their BRS/EBS spectrum and market service under the brand name Xohm.³⁴⁵ However, in November 2007, the companies announced that they had mutually agreed to terminate this arrangement, reportedly due to an inability to reach final agreement on the terms of the transaction.³⁴⁶ Sprint Nextel stated at that time that it plans to deploy a WiMAX network in the future and to launch commercial WiMAX service in the Chicago and Washington, D.C. markets during 2008.³⁴⁷

150. AT&T is using its 2.3 GHz WCS spectrum licenses to offer fixed wireless broadband Internet access service in eight U.S. markets, including Juneau, AK, where the company has deployed WiMAX technology.³⁴⁸ Downstream speeds range from 384 kbps to 1.5 Mbps.³⁴⁹ As part of the merger commitments made by the company in conjunction with its acquisition of BellSouth, AT&T plans to offer mobile or fixed wireless broadband service to 25 percent of the population covered by its WCS licenses (not including Alaska) by July 21, 2010.³⁵⁰

151. Another WCS licensee, Horizon Wi-Com, plans to launch wireless broadband service in the northeastern United States using mobile WiMAX technology.³⁵¹ The company announced in June

³⁴³ Clearwire, *Service Plans* (visited July 6, 2007), <<http://www.clearwire.com/wireless-broadband/getstarted.php>>.

³⁴⁴ *Clearwire Partners with DIRECTV and EchoStar*, News Release, Clearwire, June 14, 2007.

³⁴⁵ *Sprint Nextel and Clearwire to Partner to Accelerate and Expand the Deployment of the First Nationwide Mobile Broadband Network Using WiMAX Technology*, News Release, Sprint Nextel, July 19, 2007; *Sprint’s Xohm Will Expand Internet Access*, News Release, Sprint Nextel, Sept. 26, 2007. Each company planned to deploy portions of the network in separate areas of the country, and then enable roaming between the respective territories. Sprint Nextel was planning to build out to areas covering 185 million people, and Clearwire to areas covering 115 million people. The companies announced that they expected to cover 100 million people by the end of 2008. *Id.*

³⁴⁶ *Sprint Nextel and Clearwire Terminate WiMAX Letter of Intent*, News Release, Sprint Nextel, Nov. 9, 2007.

³⁴⁷ *Id.*

³⁴⁸ *AT&T Alascom Delivers New Broadband Internet Choice for Juneau*, News Release, AT&T, Aug. 6, 2007; Kelly Hill, *Big Players Have Big Plans for WiMAX*, RCR WIRELESS NEWS, Oct. 24, 2007 (citing AT&T spokeswoman Jenny Parker). The company has conducted trials or limited deployments of WiMAX or other fixed wireless broadband technologies in a total of 22 markets. *Id.*

³⁴⁹ *Eleventh Report*, at 10996.

³⁵⁰ Notice of Written Ex Parte Communication by Joan Marsh, AT&T, “Revised Merger Commitments,” Review of AT&T Inc. and BellSouth Corp. Application for Consent to Transfer of Control, WC Docket No. 06-74, Jan. 4, 2007, at 10. AT&T also agreed to divest its 2.5 GHz BRS/EBS spectrum, and in May 2007, Clearwire completed the acquisition of this spectrum. *Clearwire Completes Acquisition of AT&T Mobile WiMAX Spectrum*, News Release, Clearwire, May 31, 2007.

³⁵¹ W. David Gardner, *WiMax Networks Go Live in Nine Northeast Cities*, InformationWeek, June 13, 2007; *Horizon Trials WiMax*, Unstrung, June 12, 2007; *Horizon Wi-Com Selects Navini for Wireless Deployment*, News Release, Navini Networks, Jan. 15, 2007. Horizon Wi-Com purchased its WCS licenses from Verizon in 2006. W. David Gardner, *WiMax Networks Go Live in Nine Northeast Cities*, InformationWeek, June 13, 2007.

2007 that it was conducting WiMAX trials and planned to launch commercial service in nine major U.S. cities – Boston, New York, Buffalo, Philadelphia, Pittsburgh, Baltimore, Washington, Richmond, and Cincinnati – covering a population of approximately 70 million by the end of 2007.³⁵²

f. Narrowband Data Networks and Technology Deployment

152. Among the providers of narrowband mobile data services to enterprise customers, several providers use paging spectrum to operate networks that offer traditional one-way paging services. Some paging providers also operate data networks using narrowband PCS spectrum, which allow them to offer two-way messaging services. Narrowband PCS providers use the ReFLEX technology protocol, which can transmit data at speeds ranging from 3.2 to 25 kbps.³⁵³ USA Mobility's narrowband PCS network uses ReFLEX technology developed by Motorola, Inc. ("Motorola") and covers 90 percent of the U.S. population.³⁵⁴

153. In addition, Velocita Wireless operates a two-way data network using 900 MHz SMR spectrum. The network, known as Mobitex, uses packet-switched radio technology to provide always-on, two-way messaging and data delivery, and covers 93 percent of the U.S. business population.³⁵⁵ In July 2007, United Wireless Holdings, Inc. acquired Velocita Wireless from Sprint Nextel.³⁵⁶ Space Data is using narrowband PCS spectrum in the 900 MHz band and balloon-borne platforms, called SkySites™, to offer wireless telemetry services to energy and other industrial companies in Texas, Louisiana, Oklahoma, New Mexico, and the Gulf of Mexico.³⁵⁷

2. Capital Expenditures

154. Capital expenditures, alternatively called "capital spending" or abbreviated to "capex," are funds spent during a particular period to acquire or improve long-term assets such as property, plant, or equipment.³⁵⁸ In the mobile telephone industry, capex consists primarily of spending to expand and improve the geographic coverage of networks, increase the capacity of existing networks so they can serve more customers, and improve the capabilities of networks (by allowing higher data transmission speeds, for example).³⁵⁹ One analyst estimated that wireless operators spent approximately \$24.7 billion on capex during 2006, unchanged from the amount spent in 2005, but higher than the 21.4 billion spent in 2004.³⁶⁰ One analyst attributes this slowdown in capex growth to the "completion of network upgrades,

³⁵² W. David Gardner, *WiMax Networks Go Live in Nine Northeast Cities*, InformationWeek, June 13, 2007; *Horizon Trials WiMax*, Unstrung, June 12, 2007; *Horizon Wi-Com Selects Navini for Wireless Deployment*, News Release, Navini Networks, Jan. 15, 2007.

³⁵³ See *Tenth Report*, at 15955.

³⁵⁴ *Id.*; USA Mobility, *Reliability of ReFLEX* (visited July 16, 2007) <<http://www.usamobility.com/pdf/ReFLEXreliability.pdf>>.

³⁵⁵ *United Wireless Acquires Velocita Wireless, L.P.*, News Release, Velocita Wireless, July 2, 2007.

³⁵⁶ *United Wireless Acquires Velocita Wireless, L.P.*, News Release, Velocita Wireless, July 2, 2007. United Wireless Holdings is an associate of Mobitex Technology AB, a Swedish-based company that supports the technology on which the Mobitex Network is based. Velocita plans to lease spectrum for its network from Sprint Nextel. *Id.*

³⁵⁷ Space Data Corp., *Overview of SkySite Network* (visited July 11, 2007) <<http://www.spacedata.net/technology.htm>>; *Tenth Report*, at 15923.

³⁵⁸ CNNMoney, *Money 101 Glossary* (visited Mar. 20, 2003) <<http://money.cnn.com/services/glossary/c.html>>. There are differing opinions on what constitutes capital spending versus non-capital spending.

³⁵⁹ *Eighth Report*, at 14818.

better utilization of existing infrastructure, aggressive manufacturer price discounts, sharing of network capacity, and more efficient technologies.”³⁶¹

3. Roaming

155. All mobile calling plans specify a calling area – such as a particular metropolitan area, a state, a region, the provider’s entire network, or the entire United States – within which the subscriber can make a call without incurring additional charges. When a subscriber exits this area, or “roams,” he or she may incur additional charges for each minute of use.³⁶² CTIA reported that “outcollect” roaming revenues³⁶³ for the entire mobile telephone industry decreased again over the past year, from \$3.8 billion in 2005 to \$3.5 billion in 2006, a level not seen since 1998.³⁶⁴ The contribution of roaming revenues to total service revenues continued its decline, from 4.1 percent in 2004 to 3.3 percent in 2005 to 2.8 percent in 2006, down from over 10 percent seven years ago.³⁶⁵

156. Roaming revenues account for a higher percentage of total service revenues for many rural and smaller regional providers than for nationwide carriers.³⁶⁶ Rural Cellular, for example, derived 29 percent of its total wireless service revenues from roaming in the fourth quarter of 2006, while AT&T derived just 2 percent.

157. In August 2007, the Commission adopted a Report and Order clarifying that automatic roaming is a common carrier obligation for CMRS providers and stating that CMRS carriers are required to provide automatic roaming services to other carriers upon reasonable request and on a just, reasonable, and nondiscriminatory basis under Sections 201 and 202 of the Communications Act.³⁶⁷ Automatic roaming allows mobile telephone subscribers to place calls while roaming as they do in their home coverage area, by simply entering a phone number and pressing “send.” When a reasonable request is made by a technologically compatible CMRS carrier, a host CMRS carrier must provide automatic roaming to the requesting carrier outside of the requesting carrier’s home market. The common carrier obligation to provide roaming extends to real-time, two-way switched voice or data services that are interconnected with the public switched network and utilize an in-network switching facility that enables the provider to reuse frequencies and accomplish seamless hand-offs of subscriber calls. The Commission also extended the automatic roaming requirement to PTT and text messaging services, and sought comment on whether the roaming obligation should be extended to services that are classified as

(Continued from previous page) _____

³⁶⁰ *4Q06 Wireless 411*, at 67.

³⁶¹ Timothy Horan, *et al.*, *U.S. Wireless On Track To Deliver Solid Financial Results*, CIBC World Markets, Equity Research, Sept. 21, 2006, at 21.

³⁶² The fees that a carrier collects from non-subscribers using its network, including the carriers of such non-subscribers, are called “outcollect” fees, and the fees that a carrier pays for its subscribers to roam on other networks are called “incollect” fees. Margo McCall, *Roaming Feeds Regional Carriers*, WIRELESS WEEK, Mar. 26, 2001, at 23.

³⁶³ CTIA’s measure is one of “outcollect” roamer traffic revenues; in other words, the revenues generated by roamers in the providers’ markets. *Dec 2006 CTIA Survey*, at 88.

³⁶⁴ See Appendix A, Table A-1, *infra*.

³⁶⁵ *Id.* This is for the entire 12 month period.

³⁶⁶ See *4Q06 Wireless 411*, at 39 (Table 27: Roaming Revenues as a Percentage of Total Service Revenues). See also page 34 (“Roaming revenues are an important source of revenues (and EBITDA) for operators in the secondary and rural markets”).

³⁶⁷ FCC Clarifies That Roaming is a Common Carrier Obligation for Commercial Mobile Radio Service Providers, *News Release*, Federal Communications Commission, Aug. 7, 2007.

information services and services that are not CMRS.

158. Although the Report and Order did not extend the automatic roaming requirement to wireless broadband Internet access service, certain CDMA carriers have already reached roaming deals on a voluntary basis for wireless broadband Internet access service provided over EV-DO networks. As noted in the *Eleventh Report*, in May 2006 Sprint Nextel and Alltel announced a 10-year roaming deal that covers new wireless data services such as wireless broadband access as well as cellphone calls.³⁶⁸ In June 2007, Alltel announced that its roaming arrangements give its customers access to wireless broadband service through their data-card equipped laptops in the nation's largest population centers, including Boston, Philadelphia, Washington, D.C., Atlanta, Miami, St. Louis, Kansas City, Minneapolis, Dallas, Houston and San Francisco.³⁶⁹

4. Advertising and Marketing

159. Firms may engage in advertising and marketing either to inform consumers of available products or services or to increase sales by changing consumer preferences. Mobile telecommunications service is an "experience good,"³⁷⁰ and in general, advertising for an experience good tends to be persuasive rather than informational in nature.

160. In 2006, advertising spending for wireless telephone services increased 10 percent over the previous year, or roughly \$316 million.³⁷¹ Of the top ten advertisers in 2006, AT&T and Verizon³⁷² showed the greatest percentage growth on spending over the previous year (in part due to merger and acquisition activity), 44 percent and 16 percent, respectively.³⁷³ By comparison, the average increase in spending from 2005 to 2006 for the top ten advertisers was less than one percent.³⁷⁴

5. Quality of Service

161. Analysts stress that competition to attract and retain customers puts pressure on providers to improve service quality. According to the senior director of wireless services at J.D. Power and Associates, "Wireless providers have made great strides in improving call quality. With an increasingly competitive environment and an increase in the number of services used in conjunction with a cellphone, carriers that offer superior network quality are more likely to attract new customers and increase customer retention. In fact, improving network quality is a beneficial financial incentive for wireless carriers, as customers experiencing at least one call quality problem are almost four times more likely to definitely switch carriers in the future."³⁷⁵

³⁶⁸ *Eleventh Report*, at 10998.

³⁶⁹ *Alltel Extends Wireless Broadband Access for Laptops With Data Cards to Major Metro Areas*, News Release, Alltel Wireless, June 7, 2007.

³⁷⁰ An experience good is a product or service that the customer must consume before determining its quality. See Dennis W. Carlton and Jeffrey M. Perloff, *Modern Industrial Organization* (3rd ed.), Addison, Wellsley, Longman, Inc., 1999, at 484.

³⁷¹ *U.S. Advertising Spending Rose 4.6% in 2006, Nielsen Monitor-Plus Reports*, News Release, PRNEWswire, Mar. 19, 2007 ("U.S. Advertising Spending Rose 4.6% in 2006").

³⁷² These are figures for the corporate parent, not solely the wireless divisions.

³⁷³ *U.S. Advertising Spending Rose 4.6% in 2006*.

³⁷⁴ *Id.*

³⁷⁵ *J.D. Power and Associates Reports: Wireless Call Quality Problems Continue to Decline as the Transition to 3G Networks Takes Hold*, News Release, J.D. Power and Associates, Mar. 15, 2007.

162. Providers continue to rely on a diversified portfolio of strategies for improving their customers' wireless service experience. Network investment remains a key element of this portfolio. Section IV.B.1, *supra*, of this report, as well as similar sections in previous reports, detail the digital and next-generation upgrades that providers have been making to improve the coverage, capacity, and capabilities of their networks, while Section IV.B.2 provides an estimate of total spending by wireless providers on network expansion and improvements. By increasing network coverage and call handling capacity and improving network performance and capabilities, providers' investments in network deployment and upgrades have the potential to result in service quality improvements that are perceptible to consumers, such as better voice quality, higher call-completion rates, fewer dropped calls and deadzones, additional calling features, more rapid data transmission, and advanced data applications. As noted in the *Ninth Report*, one of the principal ways providers have improved network coverage and quality is by increasing the number of cell sites.³⁷⁶ The *Tenth Report* added that carriers have been deploying micro-cell sites, or antennas that provide coverage in highly localized areas, to improve coverage in locations such as tunnels, airports, and certain neighborhoods, while some carriers have also used devices that amplify cellular signals, called repeaters, to improve indoor coverage in office buildings, shopping malls, and convention centers.³⁷⁷

163. According to a 2007 press report, growing demand from business customers has increasingly put pressure on U.S. wireless carriers to improve the coverage of their networks inside office buildings.³⁷⁸ The report highlights the problem of spotty cellular coverage inside many office buildings, and explains that increasing reliance by businesses on mobile devices even for in-house activity has resulted in a growing need for offices to provide dependable wireless connections and call quality indoors. In response to this demand, the report indicates, U.S. cellular carriers are installing in-building wireless systems that provide network coverage throughout an office building, and in some cases are even covering the cost of the equipment and installation themselves in an effort to hold onto very large business customers. For instance, in September 2007, Sprint Nextel launched a service, called Airave, in which Sprint Nextel subscribers can use femtocell devices to improve indoor coverage.³⁷⁹ A femtocell is a miniature base station that transmits in the licensed spectrum of the wireless operator offering the device and provides improved coverage within a subscriber's home. It uses the subscriber's home broadband connection for backhaul. The service also allows subscribers to make unlimited wireless calls from their homes without deducting minutes from their monthly service plans.³⁸⁰

164. Several of the nationwide carriers have also set up special departments to handle the growing demand from businesses to improve in-building coverage. In addition, other, non-cellular companies specialize in installing in-building systems that work with multiple carriers and with wireless systems other than cellular.³⁸¹

³⁷⁶ *Ninth Report*, at 20657-20658.

³⁷⁷ *Tenth Report*, 15958.

³⁷⁸ Roger Cheng, *Inside Job*, WALL STREET JOURNAL, May 14, 2007, at R4. For example, the report cites the head of the in-building systems group at AT&T's wireless service as estimating that demand for the group's services has been growing at an annual rate of 10 to 15 percent in recent years.

³⁷⁹ *Sprint Customers in Select Areas of Denver and Indianapolis Get AIRAVE for Enhanced In-Home Coverage and Unlimited Calling*, News Release, Sprint, Sept. 17, 2007.

³⁸⁰ *Id.* As of October 2007, Sprint's Airave service was available in Indianapolis and Denver. *Id.*

³⁸¹ Roger Cheng, *Inside Job*, WALL STREET JOURNAL, May 14, 2007, at R4. For example, the report cites the head of the in-building systems group at AT&T's wireless service as estimating that demand for the group's services has been growing at an annual rate of 10 to 15 percent in recent years.

165. In addition to investing in their networks, carriers can increase capacity and improve service quality by acquiring additional spectrum. As detailed in Sections III.D and III.E.1 above, carriers have added to their spectrum holdings through the Commission's spectrum auctions, the purchase of licenses in the secondary market, and mergers and acquisitions. However, the *Tenth Report* cautioned that improvements in service quality tend to follow mergers with a lag due to the time it takes to complete the process of network integration.³⁸² For example, the acquisition of AT&T Wireless in October 2004 provided the former Cingular (now AT&T) with both an additional network of cell sites and significantly more spectrum.³⁸³ As noted in the *Eleventh Report*, the new AT&T had integrated nearly a third of the cell sites in areas where the two networks of the former Cingular and AT&T Wireless had overlapping coverage by the end of 2005, and it expected to substantially finalize network integration by the end of 2006.³⁸⁴ AT&T has since met this objective, completing its GSM network integration in the third quarter of 2006.³⁸⁵ AT&T credits the network integration with providing "dramatically improved call quality for Cingular customers throughout the nation."³⁸⁶

166. In addition to investing in network infrastructure and acquiring spectrum, providers continue to pursue marketing strategies designed to differentiate their brand from rival offerings based on dimensions of service quality such as superior network coverage, reliability, and voice quality. Verizon Wireless pioneered this brand differentiation strategy with its "Can You Hear Me Now?" advertising campaign,³⁸⁷ and it continues to use an advertising slogan describing its network as "America's most reliable wireless network."³⁸⁸ In March 2007, Verizon Wireless also launched its "30-Day Test Drive" promotion letting customers who sign up for a Verizon Wireless calling plan "test drive" the network for 30 days and offering to absorb the cost of their calls if customers are not satisfied with their experience and port their number to another wireless carrier at any time during the 30-day period.³⁸⁹ Beginning in 2006, AT&T's advertising campaigns have emphasized that it has the fewest dropped calls of any wireless carrier.³⁹⁰ One expert on consumer issues has interpreted AT&T's advertising blitz as "further evidence that wireless carriers are shifting their marketing focus away from pricing toward network reliability, figuring that consumers are more concerned about calls going through than how much they cost."³⁹¹

167. T-Mobile was the first nationwide provider to differentiate its service through the addition of an interactive "Personal Coverage Check" feature to its web site that enables customers to

³⁸² *Id.*

³⁸³ *Eleventh Report*, at 11000.

³⁸⁴ *Id.*

³⁸⁵ *Cingular Completes National GSM Network Integration*, News Release, Cingular Wireless, Oct. 3, 2006; *Cingular Reports Record Third-Quarter 2006 Results*, News Release, Cingular Wireless, Oct. 19, 2006.

³⁸⁶ *Cingular Completes National GSM Network Integration*, News Release, Cingular Wireless, Oct. 3, 2006.

³⁸⁷ Bruce Mohl, *The Fewest Dropped Calls*, BOSTON GLOBE, Apr. 23, 2006 ("*The Fewest Dropped Calls*").

³⁸⁸ Verizon Wireless, *America's Most Reliable Wireless Network* (visited June 7, 2007)

<www.verizonwireless.com>.

³⁸⁹ Verizon Wireless, *Test Driver's Manual* (visited June 7, 2007) <www.verizonwireless.com>; *More Real-Life Test Men and Women Test Driving the Verizon Wireless Network*, News Release, Verizon Wireless, Mar. 26, 2007.

³⁹⁰ *The Fewest Dropped Calls*; AT&T, *Why AT&T* (visited June 7, 2007) <www.wireless.att.com>.

³⁹¹ *Id.*

check the quality of network coverage where they live and work before they purchase service.³⁹² T-Mobile's computerized mapping tool allows users to search on any street address or intersection in the United States and get a rating of the signal strength at that location and in the surrounding area. For each search, T-Mobile provides a color-coded map with six shades of coverage ranging from no coverage to the best coverage. According to T-Mobile, the top rating means that calls are rarely dropped.³⁹³ T-Mobile has also made its new interactive maps available on computers in its stores. AT&T Wireless's web site also features a very similar mapping tool for checking the quality of its network coverage at particular locations.³⁹⁴ Although other carriers provide national or regional coverage maps to customers that show the cities where they provide some level of service, these maps typically provide only a broad overview of a carrier's coverage.

168. Consumer satisfaction surveys afford one means of gauging the effects of operator strategies for improving service quality on customer perceptions of service quality. Survey results and related evidence of customer satisfaction with cellphone service quality are summarized below in the section on mobile telecommunications market performance.³⁹⁵

6. Mobile Data Services and Applications

169. As described in Section III.B.1, *supra*, mobile telephone providers offer a variety of mobile data services and applications in addition to mobile voice services.³⁹⁶ The largest segment of the mobile data market consists of handset-based applications marketed to consumers primarily as an add-on to mobile voice service, including text messaging services and various MMS services such as photo messaging, entertainment applications such as ringtones, games, mobile music and video services, and information services such as web-browsing. The services offered in this first market segment are provided largely by mobile telephone operators and, in the case of certain video services, mobile video providers.

170. A second market segment consists of monthly mobile Internet access packages for customers who wish to connect to wireless networks primarily or exclusively for data, rather than voice use, and who typically access the Internet through laptop computers.³⁹⁷ In the case of both handset-based services and Internet access service for laptops, it is also important to distinguish between mobile data services provided over wireless broadband networks using technologies such as EV-DO or WCDMA/HSDPA, and those provided over slower wireless networks using earlier technologies. As noted in the *Tenth Report*, wireless broadband network technologies enable laptop users to download files, play streaming video and audio, and receive emails at speeds that are comparable to what many

³⁹² See *Tenth Report*, at 15959, citing David Kesmodel, *T-Mobile Offers More Details On Coverage to Ease Concerns*, WALL STREET JOURNAL, Apr. 27, 2005; T-Mobile, *Personal Coverage Check* (visited June 7, 2007) <www.t-mobile.com>.

³⁹³ *Tenth Report*, at 15959. More specifically, the top rating means that customers have a 95 percent chance of making a call without it being dropped.

³⁹⁴ AT&T Wireless, *AT&T Coverage Viewer* (visited December 11, 2007) <www.wireless.att.com>. Like T-Mobile's personal coverage check feature, AT&T Wireless's mapping tool allows users to search on any street address or intersection to get a rating of coverage at that location and the surrounding area, and it provides a color-coded map with five shades of coverage ranging from "no service available" to "best" coverage.

³⁹⁵ See Section VI.C, Quality of Service, *infra*.

³⁹⁶ See, e.g., *Eleventh Report*, at 11002-11003, *Eighth Report*, at 14843-14856; *Ninth Report*, at 20659-20661.

³⁹⁷ In addition to mobile telephone operators who provide mobile Internet access for laptop computers through both broadband and slower-speed data networks, broadband data providers, as described in Section III.B.3, Broadband Data Providers, *supra*, also provide wireless broadband Internet access for laptop computers on a portable basis.

users get from fixed broadband connections such as DSL, and the capabilities of handsets that can access wireless broadband networks make viewing streaming video and downloading various other applications on cellphones feel more like a broadband experience on a personal computer.³⁹⁸ For example, the faster speeds offered by wireless broadband network technologies greatly enhance the viewing quality of video streamed onto cellphones by increasing the rate at which frames are shown.³⁹⁹

171. In the past year providers have continued to exhibit competitive rivalry in introducing new mobile data offerings and responding to rivals' existing offerings. A notable example is the jockeying to provide music playing services for mobile phones. As noted in the *Eleventh Report*, in October 2005 Sprint Nextel became the first U.S. carrier to introduce an over-the-air ("OTA") music downloading service, called Sprint Music Store, which allows customers to purchase and download full-length songs over a wireless telephone network directly onto their cellphones.⁴⁰⁰ In January 2006, Verizon Wireless responded by launching a rival OTA music downloading service called V CAST Music.⁴⁰¹ Both services run on the carriers' respective EV-DO networks, and both also allow customers to transfer music from a computer to their cellphones ("sideloading") as well as to download music over the air.⁴⁰² Moreover, both carriers market their music service as a competitor to online music downloading services such as Apple's iTunes Music Store.

172. Initially, AT&T competed with these OTA offerings by selling the ROKR cellphone, which plays songs downloaded via a computer from Apple's iTunes Music Store.⁴⁰³ However, after backing the ROKR through its launch, Apple then shifted strategy in favor of developing its own music-playing handset.⁴⁰⁴ In June 2007, AT&T launched Apple's iPhone,⁴⁰⁵ which "combines the music and video features of an iPod with the communications functions of a smartphone."⁴⁰⁶ Unlike the OTA music downloading services offered by Sprint Nextel and Verizon Wireless, the iPhone only plays songs sideloaded from a computer, and initially it runs on AT&T's slower EDGE network rather than the carrier's mobile broadband network which uses WCDMA/HSDPA technology.⁴⁰⁷ However, users of standalone digital music players like Apple's iPod are well accustomed to purchasing music via

³⁹⁸ *Tenth Report*, at 15961.

³⁹⁹ *Id.*

⁴⁰⁰ *Eleventh Report*, at 11002.

⁴⁰¹ *Id.*

⁴⁰² *Id.*

⁴⁰³ *Eleventh Report*, at 11002.

⁴⁰⁴ Amol Sharma, Nick Wingfield and Li Yuan, *How Steve Jobs Played Hardball in iPhone Birth*, WALL STREET JOURNAL, Feb. 17, 2007, at A1 ("*How Steve Jobs Played Hardball in iPhone Birth*").

⁴⁰⁵ Gabrielle Coppola, Andrew LaVallee and Marcel Prince, *Roundup: All Eyes on iPhone*, WALL STREET JOURNAL, July 1, 2007.

⁴⁰⁶ Nick Wingfield and Li Yuan, *Apple's iPhone: Is It Worth It?*, WALL STREET JOURNAL, Jan. 10, 2007, at D1. *See also*, Walter S. Mossberg and Katherine Boehret, *Testing Out the iPhone*, WALL STREET JOURNAL, June 27, 2007, at D1 ("*Testing Out the iPhone*").

⁴⁰⁷ *Id.*; Li Yuan, *iPhone Fans and Foes Clash Online*, WALL STREET JOURNAL, Jan. 18, 2007, at B3; Associated Press, *Apple's Phone to Stream YouTube Videos*, WALL STREET JOURNAL ONLINE, June 21, 2007. *See also* Li Yuan and Amol Sharma, *Rivals Answer the iPhone*, WALL STREET JOURNAL, June 7, 2007, at B1 (reporting that Apple and AT&T are already developing a successor handset with a so-called third-generation chip that will speed up Web access).

sideloading,⁴⁰⁸ and consumers may be attracted to distinctive iPhone features and capabilities that are lacking in rival mobile services and devices, including the ability to download music from Apple's iTunes Music Store, a sleek design with a touch-sensitive screen, a simple user interface, and a computer-grade web browser.⁴⁰⁹

173. In July 2007, AT&T announced the launch of an OTA music download service with eMusic, the world's largest retailer of independent music.⁴¹⁰ When an AT&T customer purchases songs from eMusic Mobile, the songs are immediately sent to the customer's handset, and a duplicate copy is made available for download to the customer's PC at no additional charge. Instead of paying a flat fee to purchase and download each song, AT&T customers can subscribe to download five tracks per month for a monthly fee, with additional packages of five songs available for the same price whenever the customer desires. The eMusic Mobile service is initially available on some of AT&T's music-playing handsets from Samsung and Nokia, with other handsets to be added in the future. AT&T claims that its new OTA music downloading service is differentiated from the competition through its ease of use, subscription pricing model, and the ability to play music tracks in any MP3 player.⁴¹¹ In addition to the national carriers, regional carrier Alltel entered the music-playing business in May 2007 by launching Jump Music, a free software that enables customers to transfer compatible music files from personal computers to their wireless phones.⁴¹²

174. Operators have also continued to exhibit competitive rivalry with respect to the provision of television and video services for mobile phones. Some of these services are deployed and offered by mobile telephone providers, while others rely on the networks deployed by mobile video providers.⁴¹³ As noted in the *Tenth Report*, for the past several years, carriers such as Sprint Nextel and AT&T have been offering MobiTV, a video programming service that streams live program content onto cellphones at the same time the programs are broadcast on television, albeit with a slight delay and different local

⁴⁰⁸ *M:Metrics: Mobile Music Usage Is Climbing, But Not All Musicphones Are Created Equal*, News Release, M:Metrics, Mar. 21, 2007, at 2. Based on international survey evidence, M:Metrics concludes that sideloading is the "universally preferred source of music on mobile phones by a wide margin, compared to downloading music from carrier music stores." M:Metrics further argues that "The prevalence of sideloading, largely shaped by current usage and understanding of digital music players, shows that the perceived value in musicphones is still in the ability to make one's personal music collection portable, as opposed to a new acquisition point for music." M:Metrics also finds evidence that substitution of music-playing cellphones for standalone digital music players is becoming increasingly visible, with 31 percent of those who use both a musicphone and a digital music player in the United States selecting their musicphone as their primary music device, and 11 percent using both equally. *See also, One In Ten Mobile Subscribers Have Music-Capable Phones, But Over the Air Music Purchasing Still Slow To Catch Hold, According to Telephia*, News Release, Telephia, Jan. 8, 2007 (describing survey research showing that 2,004,228 U.S. mobile telephone subscribers, or 8.5 percent of the 23,495,033 subscribers with music players on their handsets, reported any purchases of music via OTA downloads in the third quarter of 2006).

⁴⁰⁹ *Testing Out the iPhone*; Li Yuan and Amol Sharma, *Rivals Answer the iPhone*, WALL STREET JOURNAL, June 7, 2007, at B1; Amol Sharma, Nick Wingfield and Li Yuan, *How Steve Jobs Played Hardball in iPhone Birth*, WALL STREET JOURNAL, Feb. 17, 2007, at A1; Li Yuan and Cassell Bryan-Low, *iPhone Hinges On the Likes of Mr. Digate*, WALL STREET JOURNAL, Jan. 11, 2007, at B4; Amol Sharma and Nick Wingfield, *Is iPhone AT&T's Magic Bullet?*, WALL STREET JOURNAL, June 15, 2007, at B4.

⁴¹⁰ *AT&T Mobile Music Hits the Airwaves With eMusic Mobile*, News Release, AT&T, Jul. 31, 2007.

⁴¹¹ *Id.*

⁴¹² Li Yuan and Amol Sharma, *Rivals Answer the iPhone*, WALL STREET JOURNAL, June 7, 2007, at B1; *Alltel Wireless Launches Jump Music*, News Release, Alltel Wireless, May 11, 2007.

⁴¹³ *See* Section III.B.4, Mobile Video Providers, *supra*.

commercials.⁴¹⁴ In addition, Verizon Wireless began offering video clips for cellphones over its EV-DO network through its V CAST service in early 2005;⁴¹⁵ however, initially V CAST did not include a live TV service. In March 2007, Verizon Wireless launched a rival live mobile TV service – V CAST Mobile TV – in twenty selected markets, becoming the first U.S. wireless service provider to use Qualcomm’s MediaFLO USA network and service.⁴¹⁶ Whereas MobiTV’s service runs over the same mobile telephone networks that carry calls and let users download content, MediaFLO USA uses separate towers and spectrum licenses in the 700 MHz band to operate a dedicated nationwide multicast network that is leased to wireless operators for transmitting live TV.⁴¹⁷ Because MediaFLO’s service does not use up bandwidth on the wireless operator’s network, it frees up space for other data-intensive applications such as web browsing, and therefore is touted as a more efficient means of delivering video programming to millions of mobile handsets at once, with potentially better video quality and lower costs for consumers.⁴¹⁸ AT&T also plans to use MediaFLO for its own mobile TV service starting later in 2007.⁴¹⁹

175. The growing prevalence of mobile handsets equipped with GPS technology in the United States has spurred providers to compete in offering location-based services that take advantage of GPS technology.⁴²⁰ For example, Sprint Nextel offers an array of location-based services in an effort to differentiate itself from competitors and give customers reasons to pay for data plans.⁴²¹ In 2007, Sprint Nextel began offering two new mobile-search services: a service from GPSshopper LLC, called Slifter, that uses GPS technology and retailer inventory data to enable consumers to use cellphones to find products in retail stores by locating stores that have the products they want in stock, and a service from IAC/InteractiveCorp, called Ask Mobile GPS, which lets consumers search for businesses in IAC’s Citysearch service and for tickets sold by Ticketmaster, among other things.⁴²² Sprint Nextel’s other

⁴¹⁴ *Tenth Report*, at 15960. See also, Katherine Boehret, *Testing TV on Your Cellphone*, WALL STREET JOURNAL, Feb. 28, 2007, at D10; Amol Sharma, *What’s New in Wireless*, WALL STREET JOURNAL, Mar. 26, 2007, at R1 (“*What’s New in Wireless*”).

⁴¹⁵ *Tenth Report*, at 15960.

⁴¹⁶ *What’s New in Wireless*; Brad Smith, *Mobile TV’s High Wire Act*, WirelessWeek, Apr. 15, 2007 (“*Mobile TV’s High Wire Act*”); *Verizon Reports Strong IQ 2007 Results, Driven by Top-Line Growth Across Key Markets*, News Release, Verizon Wireless, Apr. 30, 2007; *QUALCOMM and Verizon Wireless Announce Plans for Nationwide Commercial Launch of MediaFLO’s Mobile Real-time TV Services*, News Release, Verizon Wireless, Dec. 1, 2005.

⁴¹⁷ *What’s New in Wireless*; Li Yuan, *Cellphone Video Gets On the Beam*, WALL STREET JOURNAL, Jan. 4, 2007, at B3 (“*Cellphone Video Gets On the Beam*”); *Verizon Wireless Lifts Curtain on V CAST Mobile TV; True Broadcast Quality, the Best of TV*, News Release, Verizon Wireless, Jan. 7, 2007.

⁴¹⁸ *What’s New in Wireless*; *Cellphone Video Gets On the Beam; MediaFLO USA and Verizon Wireless Applaud TIA’s Approval of the FLO Air Interface Specification*, News Release, Verizon Wireless, Aug. 3, 2006 (noting that MediaFLO “provides the technology for distributing multimedia content efficiently and economically without impacting current networks.”).

⁴¹⁹ *Mobile TV’s High Wire Act*.

⁴²⁰ Market research firm Gartner Research estimates that 63 percent of mobile phones sold in North America in 2007 will have GPS or assisted GPS functions, up from 55 percent of phones sold in 2006. See Jessica E. Vascellaro, *Social Networking by Cellphone*, WALL STREET JOURNAL, Jan. 16, 2007, at B1 (“*Social Networking by Cellphone*”).

⁴²¹ Riva Richmond, *Sprint Puts Shoppers In Touch With Slifter*, WALL STREET JOURNAL, June 7, 2007, at B4 (“*Sprint Puts Shoppers In Touch With Slifter*”).

⁴²² *Id.*; *Sprint Customers Get New Location-Aware Shopping Application From GPSshopper*, News Release, Sprint, June 7, 2007.

location-based service offerings include a GPS-enabled mapping service called Sprint Nextel Navigation that provides turn-by-turn driving instructions and real-time traffic alerts, and a locator service called Sprint Nextel Family Locator that lets parents locate a child's phone on a map in real-time.⁴²³ Similarly, a GPS-enabled service launched by Verizon Wireless in January 2006, called VZ Navigator, lets customers get visual and audible driving directions to a location, locate businesses in an area, and get a map of a location, among other things.⁴²⁴ Some new GPS-enabled mobile services can be used to support social networking. For example, a "friend finding" service from Loopt Inc. uses GPS technology to enable users to track and view on their cellphones the locations of friends who are also Loopt users.⁴²⁵ The Loopt service has been available from Sprint Nextel prepaid brand subsidiary Boost Mobile since late 2006, and in July 2007 Sprint Nextel announced its own launch of the service.⁴²⁶

176. Providers are also beginning to differentiate themselves and to exhibit competitive rivalry with respect to their business models for the sale of mobile data services. Although U.S. mobile service providers tend to keep tight control on what applications are available and what services consumers can access on mobile handsets by selling content through their own branded portals (the "walled garden"⁴²⁷ approach), operators have begun selectively to allow third-party content providers to market multimedia content directly to their subscribers, in exchange for a share of the revenue generated by the sale of these services.⁴²⁸ AT&T was the first of the nationwide operators to start allowing third-party providers to sell directly to its customers, followed by T-Mobile in late 2004, Sprint in 2005, and Verizon Wireless in 2006.⁴²⁹ Operators are differentiating themselves in this regard, with some operators showing more willingness than their rivals to give their customers access to mobile content and software from third parties.⁴³⁰

⁴²³ *Sprint Puts Shoppers In Touch With Slifter; Social Networking by Cellphone; Sprint Customers Get Industry First: GPS Navigation Bundled in Data Packs*, News Release, Sprint, Mar. 21, 2007; *Sprint Family Locator Helps Give Parents Peace of Mind*, News Release, Sprint, Apr. 13, 2006. See also, Sarah Childress, *A GPS Device for Keeping Tabs on the Children*, WALL STREET JOURNAL, June 21, 2007, at D2 (noting that Walt Disney Company's Disney Mobile, as well as Sprint, both offer similar family locator services that let parents look up their child's location on a Web site or cellphone).

⁴²⁴ *Social Networking by Cellphone; VZ Navigator From Verizon Wireless*, News Release, Verizon Wireless, May 9, 2007.

⁴²⁵ *Social Networking by Cellphone*; Jessica E. Vascellaro, *Sprint to Offer Loopt's 'Friend Finding' Service*, WALL STREET JOURNAL, Jul. 17, 2007, at B4.

⁴²⁶ *Id.* See also, Jessica E. Vascellaro, *Finding a Date – On the Spot*, WALL STREET JOURNAL, June 6, 2007, at D1 (describing new mobile dating services that enable consumers to use their mobile phones to find romantic partners using ZIP Codes or street addresses, and a future service still being designed that may include GPS-enabled location-based features to enable users to search for other daters nearby).

⁴²⁷ See *700 MHz Second Report and Order*, 22 FCC Rcd, at 15362 ¶ 198.

⁴²⁸ Amol Sharma and Li Yuan, *Cellphone Carriers Let Others Sell Mobile Content to Users*, WALL STREET JOURNAL, Nov. 30, 2006, at B1 ("*Cellphone Carriers Let Others Sell Mobile Content to Users*") (noting that, among other examples, in the summer of 2006 Verizon Wireless agreed to let Major League Baseball market its content directly to the carrier's subscribers in exchange for a cut of the take, and that Cingular arranged with Yahoo Music and Napster Inc. to let subscribers who download music to their computers transfer songs to their cellphones.)

⁴²⁹ *Id.*

⁴³⁰ *Sprint Puts Shoppers In Touch With Slifter* (noting that Sprint has shown more willingness than many of its carrier competitors to give its customers access to mobile software from third parties); *Cellphone Carriers Let Others Sell Mobile Content to Users* (noting that Verizon's restrictions are the most extensive, that deals Verizon struck with Google Inc's YouTube Inc. and Revver Inc. specify that content from the video-sharing Web sites will (continued....))

177. The aforementioned Apple iPhone launched by AT&T in June 2007 represents a fundamental departure from the providers' walled garden business model.⁴³¹ Abandoning its usual insistence that the phone come installed with its proprietary software for accessing mobile content, AT&T agreed to offer the iPhone to consumers without the provider's own web surfing and entertainment service and its own line of games and ringtones.⁴³² In addition, the web browser on the iPhone allows users to browse web sites that previously did not display properly on cellphones.⁴³³ Competition from the iPhone therefore has the potential to put increased pressure on rival providers to further loosen restrictions on customer access to third-party mobile content and software. At the same time, initially Apple itself kept tight control over the types of applications and services consumers could access on the iPhone. For example, Morgan Stanley observed that "Apple has itself created a walled garden on the iPhone in terms of branding and applications."⁴³⁴ In particular, Apple initially adopted a restrictive policy on the types of independent software that could be used on the iPhone.⁴³⁵ This policy was greeted with heavy criticism from independent programmers, who complained that Apple was "stymieing innovation" by trying to exert excessive control over the device.⁴³⁶ In October 2007, Apple reversed this policy by announcing that in February 2008 the company would release a software development kit that will allow programmers to develop third-party applications for the iPhone.⁴³⁷

178. Other recent developments indicate that providers are facing growing pressures to move to an open-platform model. In November 2007, Verizon Wireless announced that, by the end of 2008, it would allow any wireless device, software, or application that meets certain technical standards to access its wireless network.⁴³⁸ The company plans to publish technical standards in early 2008 that will allow device manufacturers and application developers to design products that will interface with the network. Devices will be tested and approved in a Verizon Wireless testing lab. According to the company, any device that meets the technical standard will be activated on the network, and customers will be able to run any application on these devices.⁴³⁹ The company has also indicated that data charges for customers

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be sold through the carrier's V CAST video portal, and that when World Wrestling Entertainment Inc. made digital content available to cellphone users through its Web site, the company specified in fine print that the content was not available to Verizon subscribers).

⁴³¹ Paul Kedrosky, *The Jesus Phone*, WALL STREET JOURNAL, June 29, 2007, at A15.

⁴³² Jessica E. Vascellaro, *A Fight Over What You Can Do on a Cellphone*, WALL STREET JOURNAL, June 14, 2007, at A1; *How Steve Jobs Played Hardball in iPhone Birth*. According to these sources, Verizon Wireless declined to offer its subscribers Apple's iPhone because Verizon insisted on including its own music and video service along with Apple's and selling such content through its proprietary V CAST service, but this arrangement was unacceptable to Apple.

⁴³³ *Wireless Data: Just Getting Started*, at 6-7.

⁴³⁴ *Id.*, at 6 (further noting that "For instance, iPhone users now have the option to download music and ringtones via iTunes on a Wi-Fi network, ultimately bypassing the carriers' network"). See Section VII.B, Wireless Local Area Networks, *infra*, for a discussion of the Wi-Fi capabilities of the iPhone.

⁴³⁵ Nick Wingfield, *Apple Opens iPhone to Outside Software*, WALL STREET JOURNAL, Oct. 18, 2007, at B3 (noting that Apple had previously told programmers that it would limit independent iPhone applications to only those that run through the device's Web browser).

⁴³⁶ *Id.*

⁴³⁷ *Id.*

⁴³⁸ *Verizon Wireless to Introduce 'Any Apps, Any Device' Option for Customers in 2008*, News Release, Verizon Wireless, Nov. 27, 2007.

⁴³⁹ *Id.*

who use third-party devices will be based on usage.⁴⁴⁰

179. We note the formation of the Open Handset Alliance – an alliance of 34 handset makers, wireless providers and other technology companies led by Google Inc. (“Google”), T-Mobile, High Tech Computer Corporation (“HTC”), Qualcomm, and Motorola – that seeks to accelerate innovation and “openness” in the provision of mobile wireless services.⁴⁴¹ In November 2007, the Alliance announced, as a first step, the development of “Android,” which is intended to be the “first open, complete, and free platform created specifically for mobile devices” and which is set to be commercially deployed in the second half of 2008.⁴⁴² In addition to T-Mobile, the Alliance includes Sprint Nextel as a U.S. major mobile telephone operator member.⁴⁴³ By making cellphone software open down to the operating system, the Alliance is hoping to spur software developers to come up with new applications for cellphones, such as multi-player mobile games, customized phone screens, and location-based services.⁴⁴⁴ In addition, in July 2007, Sprint Nextel announced a partnership with Google to provide mobile Internet access services that rely on open standard application programming interfaces for Sprint Nextel’s WiMAX network, which the company plans to begin deploying in 2008.⁴⁴⁵

180. Despite these recent developments allowing access to third-party content providers, it is estimated that about three-quarters of all U.S. mobile content sales were still going through the operators’ branded portals, or storefronts, in late 2006.⁴⁴⁶ Similarly, while stressing that content outside of the providers’ walled garden (“off-deck content”) is growing faster than on-deck content due to the proliferation of third-party mobile content providers on the Internet, Morgan Stanley concludes that “the walled garden remains intact... for now.”⁴⁴⁷ Morgan Stanley bases this conclusion on survey evidence showing that 19 percent of ringtone downloads and 18 percent of game downloads in the United States are already off-deck, though these percentages are slightly higher (22 percent) for a younger generation of users aged 18-26.⁴⁴⁸

181. To further the open platform model, the Commission in the 700 MHz Second Report and Order required C Block licensees to allow customers, device manufacturers, third-party application developers, and others to use or develop the devices and applications of their choosing in C Block networks, so long as they meet all applicable regulatory requirements and comply with reasonable

⁴⁴⁰ Amol Sharma and Dionne Searcey, *Verizon to Open Cell Network to Others’ Phones*, WALL STREET JOURNAL, Nov. 28, 2007, at B1.

⁴⁴¹ See Open Handset Alliance, *Members* (visited November 30, 2007) <www.openhandsetalliance.com/oha_members.html>; see also, *Industry Leaders Announce Open Platform for Mobile Devices*, News Release, Open Handset Alliance, Nov. 5, 2007.

⁴⁴² *Id.* See also Amol Sharma and Kevin J. Delaney, *Google Unveils Cellphone Alliance*, WALL STREET JOURNAL, Nov. 5, 2007.

⁴⁴³ See Open Handset Alliance, *Members* (visited November 30, 2007) <www.openhandsetalliance.com/oha_members.html>; see also Amol Sharma and Kevin J. Delaney, *Google Unveils Cellphone Alliance*, WALL STREET JOURNAL, Nov. 5, 2007.

⁴⁴⁴ Jessica E. Vascellaro, *What Will Google Mean to Phones?*, WALL STREET JOURNAL, Nov. 5, 2007, at B1.

⁴⁴⁵ *Sprint and Google to Collaborate on WiMAX Mobile Internet Service*, News Release, Sprint Nextel, July 26, 2007.

⁴⁴⁶ *Cellphone Carriers Let Others Sell Mobile Content to Users*.

⁴⁴⁷ Simon Flannery *et al.*, *Wireless Data: Just Getting Started*, Morgan Stanley, Equity Research, Sept. 11, 2007, at 6, 16 (“*Wireless Data: Just Getting Started*”).

⁴⁴⁸ *Id.*, at 16.

conditions related to management of the wireless network (i.e., they do not cause harm to the network).⁴⁴⁹ The Commission found that the 700 MHz band provided a window of opportunity to have a significant effect on the next phase of mobile wireless technological innovation,⁴⁵⁰ and that, to the extent open platforms prove attractive to consumers, providers in other 700 MHz band blocks and other bands will have competitive incentives to offer similar choices.⁴⁵¹

182. Verizon Wireless has maintained its lead in the wireless data market based on the contribution of data to ARPU.⁴⁵² In the second quarter of 2007, Verizon's data ARPU was 19.3 percent of total ARPU, followed by AT&T (17.3 percent), Sprint Nextel (17 percent), T-Mobile (14.7 percent), and Alltel (10.4 percent).⁴⁵³ As noted in the *Eleventh Report*, the former Sprint used to be the market leader in wireless data services as measured based on this indicator, but had slipped to second place behind Verizon in the fourth quarter of 2005, after its acquisition of Nextel, because data accounted for a relatively small percentage of Nextel's total ARPU prior to the merger.⁴⁵⁴ Sprint Nextel lost further ground in the past year, moving from second to third place behind AT&T, and analysts continue to argue that this trend is due in part to Sprint Nextel's exposure to the relatively low data ARPU generated by customers on the legacy iDEN network.⁴⁵⁵

V. CONSUMER BEHAVIOR IN THE MOBILE TELECOMMUNICATIONS MARKET

183. A mobile provider can exercise market power only to the extent that mobile subscribers do not respond to price increases or adverse changes in other terms of service. If, to the contrary, enough consumers are sufficiently well-informed to take prices and other non-price factors into account when choosing their service provider, and likewise, if enough consumers have the ability and propensity to switch service providers in response to an increase in price or other harmful conduct, then the provider will have an incentive to compete on price and non-price factors. Consumer behavior will be more effective in constraining market power when the transaction costs subscribers incur in choosing and switching providers are low. Transaction costs depend on, among other factors, subscribers' access to and ability to use information, and costs and barriers to switching providers.

A. Access to Information on Mobile Telecommunications Services

184. Wireless consumers continue to demand information on the availability and quality of mobile telecommunications services, and numerous third parties have been responding to this demand by compiling and reporting such information. The sources of information available to consumers include publications such as *Consumer Reports*, trade associations, marketing and consulting firms, and several web sites dedicated to giving consumers an overview and comparison of the mobile telephone services available in their area.⁴⁵⁶ For example, the web site of J.D. Power and Associates posts the results of its annual wireless user surveys, which rate wireless service providers by region based on overall customer

⁴⁴⁹ See *700 MHz Second Report and Order*, 22 FCC Rcd at 15365 ¶ 206.

⁴⁵⁰ *Id.*, at 15363 ¶ 201.

⁴⁵¹ *Id.*, at 15364-15365 ¶ 205.

⁴⁵² See also Section VI.A.2, Average Revenue Per Unit, *infra*.

⁴⁵³ *Wireless Data: Just Getting Started*, at 13.

⁴⁵⁴ *Eleventh Report*, at 11003.

⁴⁵⁵ *Wireless Data: Just Getting Started*, at 1, 12-13.

⁴⁵⁶ See *Eleventh Report*, at 11004.

satisfaction, call quality, and customer service.⁴⁵⁷

185. In addition, the wireless industry itself has responded to this demand by launching various initiatives designed to educate consumers and help them make informed choices when purchasing wireless services. As noted above, for example, in March 2007 Verizon Wireless launched its “30-Day Test Drive” promotion letting customers who sign up for a Verizon Wireless calling plan “test drive” the network for 30 days and offering to absorb the cost of their calls if customers are not satisfied with their experience and port their number to another wireless carrier at any time during the 30-day period.⁴⁵⁸

B. Consumer Ability to Switch Service Providers

1. Churn

186. Churn refers to the percentage of current customers an operator loses over a given period of time, i.e. a company’s gross loss of customers during that time period.⁴⁵⁹ Mobile telephone operators usually express churn in terms of an average percent churn per month. For example, an operator might report an average monthly churn of 2 percent in a given fiscal quarter. In other words, on average, the operator lost 2 percent of its customers in each of the quarter’s three months, or approximately 6 percent for the quarter.

187. Most providers report churn rates between 1.5 percent and 3.0 percent per month.⁴⁶⁰ Churn rates have been trending lower for a number of years, with the nationwide carriers averaging a monthly churn rate of 1.8 percent in the first quarter of 2007, trending consistently down from 2.8 percent six years earlier.⁴⁶¹ However, churn is still a significant challenge for the industry.⁴⁶² One analyst described churn as “the biggest issue for all the wireless carriers,”⁴⁶³ while another wrote that “It’s no secret that customer turnover is a major impediment for providers.”⁴⁶⁴ Lowering churn improves profitability. As one report explained: “Cutting churn by one-fifth can increase operating income by 5% to 15%. In addition to boosting profits, improving customer loyalty allows wireless companies to increase the lifetime value of their voice customers . . . Improving customer loyalty typically can increase revenues at twice the rate of competitors.”⁴⁶⁵

⁴⁵⁷ J.D. Power and Associates, *Wireless* (visited Aug. 15, 2007) <www.jdpower.com>.

⁴⁵⁸ See Section IV.B.5, Quality of Service, *supra*.

⁴⁵⁹ CTIA defines it as “a measure of the number of subscribers disconnecting from service during the period.” *Dec 2006 CTIA Survey*, at 65.

⁴⁶⁰ *US Wireless Matrix 1Q07*, at 15.

⁴⁶¹ *Id.*, at 6. See, also, *Eleventh Report*, at 11005, for reasons for this decline.

⁴⁶² Even if the churn rate stabilizes, it continues to grow as a problem from year to year: “Keep in mind that in a flat churn environment, an increasing number of gross adds is required each year just to keep net adds flat. This is because disconnects continue to climb as the flat churn rate is applied to a larger and larger base.” Simon Flannery *et al.*, *Deteriorating Wireless Trends, Revisited*, Morgan Stanley, Equity Research, Jan. 18, 2007 at 7.

⁴⁶³ Kenneth Hein, *Carriers Locked in Content Land Grab*, BRANDWEEK.COM, Mar. 12, 2007 (citing John Hadl, CEO of Brand in Hand, a mobile marketing consultancy based in Los Angeles) (“*Carriers Locked in Content Land Grab*”).

⁴⁶⁴ Rasmus Wegener and Pratap Mukharji, *The Unassured Future of Wireless Data*, BUSINESSWEEK, Apr. 17, 2007.

⁴⁶⁵ *Id.* See also *4Q06 Wireless 411*, at 34 (“in general, operators with lower churn rates post the [highest lifetime revenue per subscriber]” and 53 (“We believe that Verizon Wireless’ industry leading low monthly churn rate is the primary driver behind its low cost structure and high margins.”)).

188. Providers have been attempting to differentiate themselves through exclusive arrangements to reduce churn. While the quality of voice service and price are still paramount,⁴⁶⁶ wireless carriers are hoping that exclusive access to content and desirable handsets will help them retain and attract customers.⁴⁶⁷ For example, Sprint Nextel has a three-year deal with the NFL which allows the carrier to offer exclusive same day, game-day highlights. Sprint Nextel also has a deal with Fox for exclusive 24 content, while T-Mobile has a deal with the NBA.⁴⁶⁸ AT&T signed an exclusive agreement with World Wrestling Entertainment (“WWE”) which will allow WWE fans to download WWE-themed wallpaper, ringtones, voice tones, graphics as well as short-form video content.⁴⁶⁹ AT&T is also the only wireless provider to offer the recently released iPhone. ETFs may also be a way to reduce churn. According to one analyst, “Carriers have long used ETFs to curb contract cutting.”⁴⁷⁰ Other analysts have noted that several carriers recently have begun to, or have plans to, prorate ETFs as part of their efforts to compete for customers.⁴⁷¹

2. Local Number Portability

189. Local number portability (“LNP”) refers to the ability of users of telecommunications services to retain, at the same location, existing telecommunications numbers when switching from one telecommunications carrier to another.⁴⁷² Thus, subscribers can port numbers between two CMRS carriers (intramodal porting) or between a CMRS and wireline carrier (intermodal porting). Under the Commission’s rules and orders, covered CMRS carriers operating in the 100 largest MSAs were required to begin providing number portability by November 24, 2003.⁴⁷³ CMRS carriers outside of the top 100 MSAs were required to be LNP-capable by May 24, 2004.⁴⁷⁴

190. Wireless number porting activity since the advent of porting has been significant. Overall, approximately 30.642 million wireless subscribers ported their numbers to another wireless carrier from December 2003 through December 2006.⁴⁷⁵ About one-third of this intramodal porting activity, or approximately 10.27 million wireless-to-wireless ports, took place in 2006.⁴⁷⁶ Monthly rates

⁴⁶⁶ Theresa Howard, *Cingular Goes 'Big' With Ads In Fourth Quarter*, USA TODAY, Dec. 10, 2006 (citing Cingular spokesman Clay Owen).

⁴⁶⁷ *Carriers Locked in Content Land Grab*.

⁴⁶⁸ *Id.*

⁴⁶⁹ *Id.*

⁴⁷⁰ *Carriers Relaxing Early Termination Fees to Compete*, COMMUNICATIONS DAILY, Nov. 14, 2007, at 11.

⁴⁷¹ *Id.*, at 10-11.

⁴⁷² 47 C.F.R. § 52.21(l).

⁴⁷³ 47 C.F.R. § 52.31(a); Verizon Wireless’s Petition for Partial Forbearance From Commercial Mobile Radio Services Number Portability Obligation and Telephone Number Portability, WT Docket No. 01-184, Telephone Number Portability, CC Docket No. 95-116, *Memorandum Opinion and Order*, 17 FCC Rcd 14972, 14986, ¶ 31 (2002) (“*Verizon Wireless LNP Order*”). In an October 2007 ruling, the Commission also expanded local number portability to VoIP, among other things. Telephone Number Requirements for IP-Enabled Services Providers, *Report and Order, Declaratory Ruling, Order on Remand, and Notice of Proposed Rulemaking*, 22 FCC Rcd 19531 (2007).

⁴⁷⁴ *Verizon Wireless LNP Order*, at 14986, ¶ 31.

⁴⁷⁵ Craig Stroup and John Vu, *Numbering Resource Utilization in the United States*, Federal Communications Commission, Aug. 2007, at 35 (“*Aug. 2007 NRUF Report*”). This figure excludes significant porting activity between Cingular and AT&T Wireless following the closing of their merger in October 2004.

⁴⁷⁶ *Id.*

of intramodal porting activity averaged about 856,000 ports during 2006, slightly down from a monthly average of about 887,000 ports in 2005 but significantly higher than a monthly average of about 743,000 ports in 2004.⁴⁷⁷

191. Another 2.083 million subscribers ported their numbers from a wireline carrier to a wireless carrier from December 2003 through December 2006.⁴⁷⁸ Monthly rates of intermodal porting from wireline carriers to wireless carriers averaged nearly 37,000 ports during 2006, down from a monthly average of about 48,300 ports in 2005 and 87,500 ports in 2004.⁴⁷⁹ Intermodal porting from wireless to wireline carriers remained relatively low at 1,000-4,000 ports per month during 2006,⁴⁸⁰ up slightly from levels in 2004-2005⁴⁸¹ but still significantly lower than wireline-to-wireless porting rates.

3. ETFs and Barriers to Switching

192. The practice of assessing ETFs against postpaid subscribers when they cancel their wireless service agreement or plan before the expiration of its term presents a barrier to consumers' ability to switch service providers. As noted by one Wall Street analyst, however, providers use long-term contracts and ETFs to subsidize handset costs; absent contracts and ETFs, consumers might have to pay higher prices for handsets upfront.⁴⁸² Other provider practices also affect consumers' ability to switch service providers. Mobile telephone service providers generally allow new customers to cancel their service for any reason without incurring the early termination fee within a grace period – typically thirty days – of signing the agreement.⁴⁸³ Consumers also have a choice between postpaid and prepaid service offerings, and they can avoid ETFs altogether by opting to purchase mobile telephone service on a prepaid basis instead of signing up for a long-term service contract.⁴⁸⁴ As noted previously in this report, one nationwide provider already pro-rates ETFs for new contract customers and the remaining three nationwide providers have announced plans to follow suit.⁴⁸⁵ The introduction and spread of pro-rated ETFs will lower the barrier to consumer switching ability compared to a flat rate by progressively reducing the fee customers pay for canceling their service early. In addition, as previously noted in this report, the five largest mobile telephone operators have all announced various policies that allow customers the option of changing elements of their contracts without requiring a contract extension. As noted in the *Eleventh Report*, the Commission has initiated two separate proceedings on the matter of ETFs.⁴⁸⁶

⁴⁷⁷ *Id.*

⁴⁷⁸ *Id.*

⁴⁷⁹ *Id.*

⁴⁸⁰ *Id.*

⁴⁸¹ *Eleventh Report*, at 11006 (noting that intermodal porting from wireless to wireline carriers remained steady at roughly 1,000-2,000 ports per month during 2004 and 2005).

⁴⁸² *Carriers Relaxing Early Termination Fees to Compete*, COMMUNICATIONS DAILY, Nov. 14, 2007, at 11.

⁴⁸³ See, e.g., AT&T Wireless, *Terms and Conditions* (visited Nov. 14, 2007) <www.wireless.att.com>.

⁴⁸⁴ See Section IV.A.3, Prepaid Service, *supra*.

⁴⁸⁵ See Section IV.A.2 Early Termination Fees and Contract Terms, *supra*.

⁴⁸⁶ *Eleventh Report*, at 10984. See “Wireless Telecommunications Bureau Seeks Comment on Petition for Declaratory Ruling Filed by CTIA Regarding Whether Early Termination Fees are ‘Rates Charged’ Within 47 U.S.C. Section 332(c)(3)(A),” *Public Notice*, 20 FCC Rcd 9100 (2005); “Wireless Telecommunications Bureau Seeks Comment on Petition for Declaratory Ruling Filed by SunCom, and Opposition and Cross-Petition for Declaratory Ruling Filed by Debra Edwards, Seeking Determination of Whether State Law Claims Regarding Early (continued....)

4. Secondary Market for Cellphone Contracts

193. Although customers who cancel their service before the term of their cellphone contract expires typically incur ETFs, in most cases providers allow customers to get out of the contract without paying a penalty by transferring the remaining time to someone else who meets the provider's approval through a credit check.⁴⁸⁷ A number of new web sites use this contractual loophole to facilitate transfers of cellphone contracts.⁴⁸⁸ In particular, the web sites help cellphone customers avoid paying penalties for early termination by putting them in touch with people seeking a cellphone contract. The sites charge existing cellphone customers a range of fees to transfer or cancel a cellphone contract, but in general the fees for transferring a contract through these web sites are much lower than the usual fees customers would have to pay for early termination.⁴⁸⁹ There is typically no fee for contract buyers to take over a cellphone contract, and many customers using the web sites offer to transfer their cellphones free of charge as an incentive to entice buyers to take over their contracts.⁴⁹⁰ Apart from a possible free phone and accessories, other potential advantages to contract buyers include avoiding a registration fee and getting a shorter contract than if they had signed with a cellphone company directly. The number of people using these sites is reported to be relatively low, and not all cellphone customers who visit the sites succeed in finding a buyer willing to take over their contract.⁴⁹¹ Nevertheless, the emergence of a nascent secondary market in cellphone contracts may help promote competition by facilitating consumers' ability to switch service providers.

VI. MOBILE TELECOMMUNICATIONS MARKET PERFORMANCE

194. The structural and behavioral characteristics of a competitive market are desirable not as ends in themselves, but rather as a means of bringing tangible benefits to consumers such as lower prices, higher quality and greater choice of services. Such consumer outcomes are the ultimate test of effective competition. To determine if these goals are met and whether there is still effective competition in the market, in this section we analyze various metrics including pricing levels and trends, subscriber growth and penetration, MOUs, innovation and diffusion of services, and quality of service.

A. Pricing Levels and Trends

1. Pricing Trends

a. Mobile Telephony

195. Wide variations in the non-price terms and features of wireless service plans make it difficult to characterize the price of mobile telephone service, and consequently it is difficult to identify sources of information that track mobile telephone prices in a comprehensive manner.⁴⁹² As documented in previous reports, there is ample evidence of a sharp decline in mobile telephone prices in the period since the launch of PCS service. During 2006, however, pricing has been relatively stable, due in part to,

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Termination Fees are Subject to Preemption Under 47 U.S.C. Section 332(c)(3)(A)," *Public Notice*, 20 FCC Rcd 9103 (2005).

⁴⁸⁷ Lauren Tara Lacapra, *Breaking Free of a Cellular Contract*, WALL STREET JOURNAL, Nov. 30, 2006, at D1 (noting that this "loophole" in cellphone contracts is available "to nearly all customers with long-term plans").

⁴⁸⁸ *Id.*

⁴⁸⁹ *Id.*

⁴⁹⁰ *Id.*

⁴⁹¹ *Id.* See also Suzanne Barlyn, *How to Dump a Cellphone Contract*, WALL STREET JOURNAL, Sept. 6, 2007, at D2.

⁴⁹² See *Fourth Report*, at 10164-10165.

as one analyst characterized it, “already very low pricing.”⁴⁹³ However, one analyst saw evidence of more aggressive discounting: “Already, the price per minute is off 10% the past year, 28% over the past two years and 40% over the past three years.”⁴⁹⁴

196. Of the three indicators of mobile telephone pricing examined here, one showed the cost of mobile telephone service fell in 2006, another showed no change, and a third showed an increase.⁴⁹⁵

197. According to one economic research and consulting firm, Econ One, mobile telephone prices in the 25 largest U.S. cities increased 5.6 percent in 2006.⁴⁹⁶ The average cost of monthly service⁴⁹⁷ – which was calculated across four typical usage plans (200, 500, 800 and 1100 minutes) – increased from \$44.90 in December 2005 to \$47.42 in December 2006.⁴⁹⁸

198. Another source of price information is the cellular telephone services component of the Consumer Price Index (“Cellular CPI”) produced by the United States Department of Labor’s Bureau of Labor Statistics (“BLS”).⁴⁹⁹ Cellular CPI data is published on a national basis only.⁵⁰⁰ From 2005 to

⁴⁹³ Timothy Horan, *et al.*, *U.S. Wireless On Track To Deliver Solid Financial Results*, CIBC World Markets, Equity Research, Sept. 21, 2006, at 19. *See also*, David W. Barden, *et al.*, *Wireless Services & Handset Pricing Analysis*, Bank of America, Equity Research, Dec. 19, 2006, at 3 (“we maintain our view that point of sale and experiential pricing remain largely stable in the U.S. wireless industry”).

⁴⁹⁴ Simon Flannery *et al.*, *Deteriorating Wireless Trends, Revisited*, Morgan Stanley, Equity Research, Jan. 18, 2007 at 2.

⁴⁹⁵ Fees for actual service are only one element of cost that consumers face. Handset prices, for example, are another. One analyst calculated that the average handset was discounted 60 percent compared to its original price (*i.e.*, the advertised price). The analyst also claimed that, “handsets, and not the [monthly recurring charge], are emerging as the competitive intersection in the wireless industry.” David W. Barden, *et al.*, *Wireless Services & Handset Pricing Analysis*, Bank of America, Equity Research, Dec. 19, 2006, at 8-9.

⁴⁹⁶ *Econ One Wireless Survey: Wireless Costs Down*, News Release, Econ One, Jan. 17, 2006; *Econ One Wireless Survey: Econ One Wireless Survey: Wireless Service Cost Down*, News Release, Econ One, Jan. 24, 2007. The survey is based on an analysis of pricing plan data collected from carriers’ web sites. FCC, *Commercial Mobile Radio Services (CMRS) Competition Report Public Forum: Public Hearing for 7th Annual CMRS Competition Report*, available at <<http://wireless.fcc.gov/services/cmrs/presentations/020228.pdf>>, at 78 (“*Transcript*”).

⁴⁹⁷ This does not include any additional charges for roaming or long-distance service.

⁴⁹⁸ The analysis assumes a 70 percent peak/30 percent off-peak split in the kind of minutes used.

⁴⁹⁹ *See* Table 13: Change in CPI, *infra*. The Consumer Price Index (“CPI”) is a measure of the average change over time in the prices paid by urban consumers for a fixed market basket of consumer goods and services. The basket of goods includes over 200 categories including items such as food and beverages, housing, apparel, transportation, medical care, recreation, education, and communications. The CPI provides a way for consumers to compare what the market basket of goods and services costs this month with what the same market basket cost a month or a year ago. Starting in December of 1997, this basket of goods included a category for cellular telephone services. All CPI figures discussed in this paragraph were taken from BLS databases found on the BLS Internet site at <<http://www.bls.gov>>. The index used in this analysis, the CPI for All Urban Consumers (CPI-U), represents about 87 percent of the total U.S. population. Bureau of Labor Statistics, *Consumer Price Index: Frequently Asked Questions* (visited May 1, 2006) <<http://www.bls.gov/cpi/cpifaq.htm>>. While the CPI-U is urban-oriented, it does include expenditure patterns of some of the rural population. *Transcript*, at 59. Information submitted by companies for the CPI is provided on a voluntary basis. *Transcript*, at 53.

⁵⁰⁰ *Transcript*, at 50. The Cellular CPI includes charges from all telephone companies that supply “cellular telephone services,” which are defined as “domestic personal consumer phone services where the telephone instrument is portable and it sends/receives signals for calls by wireless transmission.” This measure does not include business calls, telephone equipment rentals, portable radios, and pagers. Bureau of Labor Statistics, *How* (continued....)

2006, the annual Cellular CPI decreased by about 0.6 percent while the overall CPI increased by 3.2 percent. The Cellular CPI has declined 35 percent since December 1997, when BLS began tracking it.⁵⁰¹

Table 13: Change in CPI

	CPI		Cellular CPI		All Telephone CPI		Local Telephone CPI		Long Distance Telephone CPI	
	Index Value	Annual Change	Index Value	Annual Change	Index Value	Annual Change	Index Value	Annual Change	Index Value	Annual Change
Dec 1997	100		100		100		100		100	
1998	101.6		95.1		100.7		101.6		100.5	
1999	103.8	2.2%	84.9	-10.7%	100.1	-0.6%	103.4	1.8%	98.2	-2.3%
2000	107.3	3.4%	76	-10.5%	98.5	-1.6%	107.7	4.1%	91.8	-6.5%
2001	110.3	2.8%	68.1	-10.4%	99.3	0.8%	113.3	5.2%	88.8	-3.3%
2002	112.1	1.6%	67.4	-1.0%	99.7	0.4%	118.5	4.5%	84.9	-4.4%
2003	114.6	2.3%	66.8	-0.9%	98.3	-1.4%	123.3	4.1%	77.8	-8.4%
2004	117.7	2.7%	66.2	-0.9%	95.8	-2.5%	125.1	1.5%	70.9	-8.9%
2005	121.7	3.4%	65	-1.8%	94.9	-0.9%	128.5	2.7%	67.5	-4.8%
2006	125.6	3.2%	64.6	-0.6%	95.8	0.9%	131.1	2.1%	68.3	1.2%
Dec 1997 to 2006		25.6%		-35.4%		-4.2%		31.1%		-31.7%

Source: Bureau of Labor Statistics.

199. As a third pricing indicator, some analysts believe average revenue per minute (“RPM”) is a good proxy for mobile pricing.⁵⁰² This is calculated by dividing a provider’s estimate of average monthly revenue per subscriber (often referred to as average revenue per unit, or “ARPU”) by its estimate of MOUs, yielding the RPM that the provider is receiving.⁵⁰³ Using estimates of industry-wide ARPU and MOUs from CTIA’s survey, we estimate that RPM was \$.07 in December 2006, unchanged from December 2005. In the twelve years since 1994, RPM has fallen from \$0.47 in December 1994 to \$0.07 in December 2006, a decline of 85 percent.⁵⁰⁴

200. Until the last two years, revenues from wireless data services were a relatively insignificant portion of the average wireless subscriber’s bill. However, in the last two years, data has become an ever increasing portion of that bill.⁵⁰⁵ Because the denominator in our RPM calculation measures usage based on the number of billable minutes of voice calls, rather than voice and data services combined, RPM becomes an increasingly inaccurate measure of the pricing of mobile voice service as the

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BLS Measures Price Change for Cellular Telephone Service in the Consumer Price Index (visited May 1, 2006) <<http://www.bls.gov/cpi/cpifactc.htm>>.

⁵⁰¹ From December 1997 compared to the annual index.

⁵⁰² See *US Wireless Matrix IQ07*, at 52.

⁵⁰³ Note that this version of ARPU is CTIA’s “Average Local Monthly Bill” (“ALMB”) and does not include toll or roaming revenues where they are not priced into a calling plan. See note 514, *infra*.

⁵⁰⁴ See Table 14: Average Revenue Per Minute, *infra*.

⁵⁰⁵ *Wireless Data: Just Getting Started*, at 10.

contribution of data services to total revenues increases. To correct this, in this year's report, we include a revised version of RPM, "Voice RPM," which excludes that portion of ARPU generated by data services.⁵⁰⁶ While RPM and Voice RPM have been mostly identical over time, in absolute value and trend, in the last three years, they have diverged somewhat, with the decline in Voice RPM steeper, and its absolute value slightly lower, than RPM.

Table 14: Average Revenue Per Minute

	Average Local Monthly Bill	Minutes of Use Per Month	Average Revenue Per Minute	Annual Change in Overall RPM	Wireless Data Revenue as Percent of Total Service Revenues	Average Local Monthly Bill (excl. Data Revenues)	Average Revenue Per Voice Minute	Annual Change in Voice RPM
1993	\$61.49	140	\$0.44		n/a	\$61.49	\$0.44	
1994	\$56.21	119	\$0.47	8%	n/a	\$56.21	\$0.47	8%
1995	\$51.00	119	\$0.43	-9%	n/a	\$51.00	\$0.43	-9%
1996	\$47.70	125	\$0.38	-11%	n/a	\$47.70	\$0.38	-11%
1997	\$42.78	117	\$0.37	-4%	n/a	\$42.78	\$0.37	-4%
1998	\$39.43	136	\$0.29	-21%	n/a	\$39.43	\$0.29	-21%
1999	\$41.24	185	\$0.22	-23%	0.2%	\$41.16	\$0.22	-23%
2000	\$45.27	255	\$0.18	-20%	0.4%	\$45.09	\$0.18	-21%
2001	\$47.37	380	\$0.12	-30%	0.9%	\$46.94	\$0.12	-30%
2002	\$48.40	427	\$0.11	-9%	1.2%	\$47.82	\$0.11	-9%
2003	\$49.91	507	\$0.10	-13%	2.5%	\$48.66	\$0.10	-14%
2004	\$50.64	584	\$0.09	-12%	4.8%	\$48.21	\$0.08	-14%
2005	\$49.98	708	\$0.07	-19%	8.3%	\$45.83	\$0.06	-22%
2006	\$50.56	714	\$0.07	0%	13.5%	\$43.73	\$0.06	-5%

Note: Data covers the last six months of each year. For purposes of this presentation in this table, RPM is rounded to two decimal places, but RPM change is based on absolute RPM.

Source: See Appendix A, Table 1 (ARPU); Dec 2006 CTIA Survey, at 110 (Wireless Data as a Percentage of Monthly Subscriber ARPU), and 231-232 (minutes of use).

b. Mobile Data

201. Unlike mobile voice service, mobile data services are not billed uniformly based on a single unit of measurement such as the number of billable minutes. As noted previously, some types of mobile data services are billed based on each use or download of an application, others are billed based on the number of kilobytes consumed – or alternatively the amount of airtime required – to purchase and download an application, and some are billed based on a combination of these methods.⁵⁰⁷ Consequently, there is no quantitative measure of mobile data usage corresponding to MOUs that can be used to track pricing trends for mobile data services on an aggregated basis. However, we will report pricing indicators for individual types of mobile data applications as and when they become available.

202. Morgan Stanley reports that the average price of text messaging declined for the first time

⁵⁰⁶ To generate Voice RPM, we subtracted wireless data revenues, derived from CTIA's survey, from ALMB (we assumed this was the same percentage of wireless data revenues in CTIA's measure of total service revenues), then we divided that number by CTIA's average MOUs per month.

⁵⁰⁷ See Section IV.A.4, Mobile Data Pricing, *supra*.

in 2006 after rising continuously since 2002.⁵⁰⁸ In particular, Morgan Stanley estimates that the price per text message rose from \$0.015 in 2002 to \$0.037 in 2005, and then fell to \$0.036 in 2006.⁵⁰⁹ Given increases in the unit price of sending text messages on a pay-as-you-go basis in the past year,⁵¹⁰ this decline is attributable to the increased use of volume-discounted monthly text messaging packages and unlimited text messaging plans.⁵¹¹

203. Morgan Stanley further notes that wireless data services often have much higher gross margins than voice, and that text messaging is believed to be the most profitable, with margins of 90 percent or more.⁵¹² However, Morgan Stanley suggests that the higher profitability of data services is but a temporary phenomenon since, “as with everything in wireless, new features are often quickly replicated by the competition resulting in pricing pressure over time.”⁵¹³

2. Average Revenue Per Unit

204. ARPU is a widely used financial metric in analyzing the mobile telephone sector. Since 1999, following a decade of declines, CTIA’s estimate of ARPU began increasing, rising to \$50.64 in December 2004, a 28 percent increase from the low of eight years ago.⁵¹⁴ However, for the past three years, ARPU has remained roughly the same, at around \$50. As seen in the table, declining voice ARPU (due to various factors, including further declines in the per-minute price of mobile calls⁵¹⁵ and an increase in the share of subscribers who typically spend less per month on mobile calls, such as prepaid and family plan customers)⁵¹⁶ continues to be offset by growth in data ARPU.⁵¹⁷ According to CTIA, in the last half of 2006, data revenues made up 13.5 percent of total wireless service revenues, compared to

⁵⁰⁸ *Wireless Data: Just Getting Started*, at 11.

⁵⁰⁹ *Id.* Morgan Stanley’s estimates of the price per text message in 2003 and 2004 are \$0.022 and \$0.033, respectively.

⁵¹⁰ *See Eleventh Report*, at 10987, note 243 (noting that providers were generally charging \$0.10 per message for text messaging on a pay-as-you-go basis). At this writing, the pay-as-you-go rate for text messaging generally appears to have increased to a minimum of \$0.15 per message. *See, e.g.*, T-Mobile, *Text Messaging* (visited Sept. 12, 2007) <www.t-mobile.com>; AT&T, *Messaging and MEdia Bundles* (visited Sept. 12, 2007) <www.wireless.att.com>; Verizon Wireless, *Messaging FAQs* (visited Sept. 12, 2007) <www.verizonwireless.com>.

⁵¹¹ *Wireless Data: Just Getting Started*, at 11. *See also* IV.A.4, *Mobile Data Pricing*, *supra*.

⁵¹² *Wireless Data: Just Getting Started*, at 3.

⁵¹³ *Id.*

⁵¹⁴ *See* Table 14: Average Revenue Per Minute, *supra*. There are different ways of calculating ARPU. The measure used here, CTIA’s “average local monthly bill,” does not include toll or roaming revenues (CTIA calls it “the equivalent of ‘local ARPU’”). *Dec 2006 CTIA Survey*, at 215. CTIA defines an alternative measure of ARPU, which includes roaming revenues but not toll revenue. For a comparison between these two measures, *see Dec 2006 CTIA Survey*, at 216.

⁵¹⁵ *See* Section VI.A.1, *Pricing Trends*, *supra*. *See also*, Simon Flannery *et al.*, *3Q06 Trend Tracker*, Morgan Stanley, Equity Research, Dec. 4, 2006, at 36 (“The challenging ARPUs, despite data, are the result of price cutting in the form of family plans, free in-network calling, free nights and weekends, rollover, free incoming calls, free cell-to-home and the like, as well as the growing mix of prepaid subscribers.”).

⁵¹⁶ *See, e.g.*, Simon Flannery *et al.*, *Deteriorating Wireless Trends, Revisited*, Morgan Stanley, Equity Research, Jan. 18, 2007, at 3 (“a growing portion of these net adds are coming from lower-ARPU family plans, prepaid customers, and others receiving larger buckets of minutes at lower per-minute prices.”)

⁵¹⁷ *See also*, *4Q06 Wireless 411*, at 15; and *Eleventh Report*, at 11008-11009.

8.3 percent a year earlier, an increase of 63 percent. For the nationwide operators, in the fourth quarter of 2006, data accounted for 16 percent of service revenues, versus about 10 percent a year earlier.⁵¹⁸

B. Quantity of Services Purchased

1. Subscriber Growth

a. Mobile Telephony

205. Since the *Seventh Report*, in an effort to improve the accuracy of its estimate of U.S. mobile telephone subscribership, the Commission began analyzing information filed directly with the FCC. This information, the NRUF data,⁵¹⁹ tracks phone number usage information for the United States.⁵²⁰ All mobile wireless carriers must report to the FCC which of their phone numbers have been assigned to end-users, thereby permitting the Commission to make more accurate estimates of subscribership.⁵²¹ In previous years, for the purposes of this report, the Commission had relied on national subscribership data from a highly-respected survey conducted by CTIA.⁵²² While the Commission now uses NRUF data as the basis for its estimate of mobile telephone subscribership for the

⁵¹⁸ *4Q06 Wireless 411*, at 15.

⁵¹⁹ Carriers began reporting NRUF data biannually beginning with the period ending June 2000. In addition, the Commission's local competition and broadband data gathering program, adopted in March 2000, provides more data on mobile subscribership. The FCC used to require only mobile wireless carriers with over 10,000 facility-based subscribers in a state to report the number of their subscribers in those states twice a year to the Commission. See *Local Competition and Broadband Reporting, Report and Order*, 15 FCC Rcd 7717, 7743 (2000). In 2004, however, the Commission changed the requirement so that all carriers must report the number of their subscribers, regardless of how many they serve, beginning in June 30, 2005. See *Local Telephone Competition and Broadband Reporting, Report and Order*, 19 FCC Rcd 22340, 22345 (2004). In their June 30, 2006 filings, operators reported that they served 217 million subscribers. See Appendix A, Table A-2, *infra*.

⁵²⁰ When the North American Numbering Plan ("NANP") was established in 1947, only 86 area codes were assigned to carriers in the United States. Only 61 new codes were added during the next 50 years. But the rate of activation has increased dramatically since then. Between January 1, 1997 and December 31, 2000, 84 new codes were activated in the United States. Because the remaining supply of unassigned area codes is dwindling, and because a premature exhaustion of area codes would impose significant costs on consumers, the Commission has taken a number of steps to ensure that the limited numbering resources are used efficiently. Among other things, the Commission requires carriers to submit data on numbering resource utilization and forecasts twice a year. See Federal Communications Commission, *Numbering Resource Utilization in the United States as of June 30, 2001* (Nov. 2001), at 1, 2. This information is submitted to the FCC on Form 502. *Id.*

⁵²¹ See Federal Communications Commission, *Numbering Resource Utilization in the United States as of June 30, 2001* (Nov. 2001), at 1, 2. An assigned number is one that is in use by an end-user customer. *Id.*, at 3. Carriers also report other phone number categories, including: intermediate – numbers given to other companies; aging – numbers held out of circulation; administrative – numbers for internal uses; reserved – numbers reserved for later activation; and available – numbers available to be assigned. *Id.* Assigned numbers are not necessarily from facilities-based carriers. A reseller can assign a number to an end user. This does not double-count in the assigned total, since the facilities-based carrier only counts that number as an "intermediate" number given to the reseller. *Id.*

⁵²² See *Dec 2006 CTIA Survey*. The CTIA effort is a voluntary survey of both its member and non-member facilities-based providers of wireless service. CTIA asks majority owners of corporations to report information for the entire corporation, which helps eliminate double counting. To encourage honest reporting, the surveys are tabulated by an independent accounting firm under terms of confidentiality and are later destroyed. CTIA receives only the aggregate, national totals. Not all wireless carriers submit surveys, however. In order to develop an estimate of total U.S. wireless subscribership, CTIA identifies the markets which are not represented in the survey responses. Then, CTIA uses third-party estimates or extrapolates from surrogate and/or historical data to create an estimate of subscribership for those markets. See *Eighth Report*, at 14813, note 211.

purposes of this report, we continue to report the CTIA data as a benchmark for comparison.⁵²³

206. As of December 2006, we estimate that there were 241.8 million mobile telephone subscribers,⁵²⁴ up from 213.0 million at the end of 2004, which translates into a nationwide penetration rate of 80 percent.⁵²⁵ This addition of 28.8 million subscribers was slightly more than the 28.3 million added in 2005, and is the largest absolute yearly increase in the number of subscribers. In the last two years alone, the total mobile telephone subscriber base has increased 31 percent.

Table 15: NRUF-Estimated Mobile Telephone Subscribers

	Subscribers (millions)	Increase from previous year (millions)	Penetration Rate
2001	128.5	n/a	45 %
2002	141.8	13.3	49 %
2003	160.6	18.8	54 %
2004	184.7	24.1	62 %
2005	213.0	28.3	71 %
2006	241.8	28.8	80 %

Source: Federal Communications Commission estimates.

207. CTIA's estimate for year-end 2006 was 233.0 million subscribers, a 12 percent increase over its estimate of 207.9 million subscribers as of year-end 2005.⁵²⁶ CTIA's estimate shows a similar trend in subscriber growth, with the increase of 25.1 million subscribers shown by its 2006 survey its second largest ever, slightly less than the 25.8 added in 2005.⁵²⁷

208. Some analysts attribute this high subscriber growth to the attractiveness of innovative

⁵²³ The advantages of NRUF data over CTIA's survey are discussed in the *Seventh Report*, at 13004.

⁵²⁴ FCC estimate, based on preliminary year-end 2005 filings for Numbering Resource Utilization in the United States, adjusted for porting. In NRUF, carriers do not report numbers that have been ported to them. See Section V.B.2, Local Number Portability, *supra*. Therefore, in order to develop an estimate of wireless subscribership, it is necessary to adjust the raw NRUF data to account for wireless subscribers who have transferred their wireline numbers to wireless accounts. Porting adjustments are developed from the telephone number porting database managed by the Local Number Portability Administrator, which is currently NeuStar, Inc. The database contains all ported numbers currently in service. It also contains information about when the number was most recently ported (to a carrier other than the carrier to which the number originally was assigned) or, in some cases, when the database was updated to reflect a new area code. *Trends in Telephone Service*, Federal Communications Commission, Apr. 2005, at 8-2 – 8-3.

⁵²⁵ The nationwide penetration rate is calculated by dividing total mobile telephone subscribers by the total U.S. population. According to the Bureau of the Census, the combined population of the 50 states, the District of Columbia, and Puerto Rico as of July 1, 2006 was estimated to be 303.3 million. See U.S. Census Bureau, *National and State Population Estimates: Annual Population Estimates 2000 to 2006* (visited Jun. 18, 2006) <<http://www.census.gov/popest/states/tables/NST-EST2006-01.xls>>. The number of subscribers refers to the number of phone numbers that have been assigned to mobile wireless devices. A particular individual may have more than one wireless device.

⁵²⁶ See Appendix A, Table A-1, *infra*.

⁵²⁷ *Id.*

service models, particularly prepaid options. As one analyst wrote, “Our survey suggests that prepaid is playing a major role in growing US wireless penetration.”⁵²⁸

209. In addition, we estimate that almost all wireless subscribers were digital subscribers at the end of 2006, with approximately one percent or less being analog-only⁵²⁹ mobile telephone subscribers.⁵³⁰ In the *Eleventh Report*, we estimated that digital subscribers made up more than 98 percent of all wireless subscribers at end of 2005.⁵³¹ In filings made with the Commission in conjunction with the analog sunset, certain mobile telephone operators with cellular licenses have reported the percentage of their subscriber bases that are analog-only. For instance, both Verizon Wireless and AT&T reported that 0.5 percent of their respective customer bases were analog-only at the end of 2006, while Alltel reported that .96 percent of its customers were analog as of January 31, 2007.⁵³²

b. Mobile Data

210. The percentage of U.S. mobile telephone subscribers that uses mobile data services continued to rise in the past year. Morgan Stanley estimates that mobile subscribers who use data services represented nearly 59 percent of Verizon Wireless’s customer base in the first quarter of 2007, up from about 45 percent in the fourth quarter of 2005, and similarly that the share of data users in AT&T’s mobile subscriber base rose to nearly 54 percent in the first quarter of 2007 from approximately 43 percent in the fourth quarter of 2005.⁵³³

211. The adoption of mobile data services by U.S. mobile telephone subscribers continues to vary by type of application, with text messaging, or SMS, maintaining its lead as the most popular application. Based on a survey⁵³⁴ of U.S. mobile subscribers for the three-month period ending on January 31, 2007, research firm M:Metrics estimates that 39.2 percent of U.S. mobile subscribers sent a text message in this period, 14.7 percent used photo messaging, 10.3 percent browsed news and

⁵²⁸ Simon Flannery *et al.*, *Robust Wireless Quarter as Prepaid Surges*, Morgan Stanley, Equity Research, Jan. 17, 2007, at 13.

⁵²⁹ Subscribers that can access both the digital and analog networks of carriers are considered to be digital subscribers.

⁵³⁰ The sources for our digital subscribership estimate in previous years, the quarterly “411” report from UBS Warburg as well as CTIA’s semi-annual survey, have stopped making estimates of digital subscribership. We estimated the digital penetration rates to be 98.5 percent at the end of 2005. *Eleventh Report*, at 11011, note 436. Another analyst estimated that, as of December 2005, there were just 2.3 million consumers subscribed to analog cellphone plans, primarily in rural areas. Ken Belson, *Analog Callers Hung Up in a Digital Country*, NYTIMES.COM, May 3, 2006 (citing Ana Hermoso, an analyst at Informa Telecoms & Media, a research firm in London). Using a range of 2.3 million (Informa estimate) to 3.2 million (*Eleventh Report* estimate) for analog-only subscribers from 2005, and assuming that all new subscribers in 2006 were digital, we generate a range of 1.3 to .95 percent analog-only subscribers by the end of 2006.

⁵³¹ *Eleventh Report*, at 11011.

⁵³² Verizon Wireless Analog Sunset Report, Mar. 2, 2007, at 3; AT&T Mobility LLC F/K/A Cingular Wireless LLC Second Analog Sunset Report, Feb. 26, 2007, at 11; Alltel Cellular AMPS Report, Mar. 19, 2007, at 1. All of the analog sunset reports are available of the FCC’s web site at <http://wireless.fcc.gov/services/index.htm?job=cellular_reports&id=cellular>.

⁵³³ *Wireless Data: Just Getting Started*, at 3.

⁵³⁴ Since most mobile data services continue to be sold as add-ons to mobile voice services rather than as separate data-only service offerings, measures of the adoption of mobile data services by U.S. mobile telephone subscribers are generally based on indirect methods of gathering evidence such as surveys of mobile subscribers or analysis of their billing records. See *Eleventh Report*, at 11011.

information, 10 percent purchased ringtones, 8.5 percent used personal email, 6.3 percent used mobile instant messaging, 5.1 percent used work email, 3.6 percent downloaded mobile games, and 3.5 percent purchased wallpaper or screensavers.⁵³⁵ These results show a slight increase in penetration for all except two applications (instant messaging and purchasing wallpaper or screensavers) compared to survey results for the first quarter of 2006 cited in the *Eleventh Report*.⁵³⁶

212. Morgan Stanley stresses that the adoption of mobile data services varies by age group, with younger subscribers far more likely to adopt data services than U.S. cellphone users as a whole.⁵³⁷ Based in part on survey research from Forrester Research, Morgan Stanley estimates that whereas only 38 percent of all cellphone users use text messaging, around 70 percent of users aged 18-26 (“Generation Y” or “Gen Y”) and nearly 50 percent of users aged 27-40 (“Generation X” or “Gen X”) texts.⁵³⁸ According to Morgan Stanley, Gen Y is often twice as likely to use a given data service compared to the average penetration for U.S. cellphone users.⁵³⁹ Like the survey results from M:Metrics, the survey results from Forrester Research cited by Morgan Stanley also show that the adoption of mobile data services by U.S. mobile telephone subscribers varies by type of application, with text messaging having the highest adoption rate among all U.S. cellphone users at 38 percent, followed by picture messaging (about 21 percent), downloading ringtones (about 19 percent), e-mail (about 13 percent), and the remaining applications – including downloading games, instant messaging, downloading music or videos, checking the weather, reading news, and looking up directions – around or below 10 percent.⁵⁴⁰

213. Subscribership to mobile video services has grown significantly in the past year. The *Eleventh Report* noted that an estimated one million people were subscribers to TV services on their cellphones at the end of 2005.⁵⁴¹ In comparison, M:Metrics estimates that 6 million Americans watched mobile video, which includes both TV programming and downloaded or streaming video, at least once a month during the three-month period ending in February 2007, and that about 650,000 people watched it nearly every day.⁵⁴² Another research firm, Telephia, estimates that there were 6.2 million mobile video subscribers in the United States in the last quarter of 2006, an increase of 145 percent from the first quarter of the year but still less than three percent of total U.S. cellphone users.⁵⁴³ More recently, Telephia reported that the number of U.S. mobile video subscribers had grown to 8.4 million in the first quarter of 2007, with penetration doubling from 1.6 percent to 3.6 percent of subscribers since the first

⁵³⁵ *M:Metrics: Mobile Music Usage is Climbing, But Not All Musicphones are Created Equal*, News Release, M:Metrics, Mar. 21, 2007, at 5. The percentages are monthly averages for the three-month period ending January 31, 2007.

⁵³⁶ See *Eleventh Report*, at 11011-11012. M:Metrics estimated that 34.9 percent of U.S. mobile subscribers sent text messages in the first quarter of 2006, 10.9 percent used photo messaging, 9.9 percent browsed news and information, 9.9 percent purchased ringtones, 7.1 percent used personal email, 6.3 percent used mobile instant messenger, 4.1 percent used work email, 3.7 percent purchased wallpaper or screensavers, and 2.7 percent downloaded a mobile game.

⁵³⁷ *Wireless Data: Just Getting Started*, at 5, 15.

⁵³⁸ *Id.*

⁵³⁹ *Id.*, at 15.

⁵⁴⁰ *Id.*

⁵⁴¹ *Id.*, at 11012.

⁵⁴² Brad Smith, *Mobile TV's High Wire Act*, WIRELESSWEEK, Apr. 15, 2007.

⁵⁴³ *Id.*; Chris Pursell, *Mobile TV Gets Worldwide Focus*, TELEVISIONWEEK, Apr. 16, 2007.

quarter of 2006.⁵⁴⁴ Similarly, the research firm Yankee Group estimates that 2.5 percent of U.S. cellphone users, or about 6.045 million Americans, watch video content on their cellphones at least once a month.⁵⁴⁵

214. Other mobile data applications that are growing in popularity include music and mobile dating services. M:Metrics estimates that 2.4 million U.S. mobile phone subscribers downloaded music over the air from a wireless provider in the three-month period ending in April 2007, up from 1.6 million in the three-month period ending in January 2007.⁵⁴⁶ In comparison, M:Metrics estimates that 7.1 million U.S. mobile phone subscribers listened to music transferred from a computer on their cellphones in the three-month period ending in April 2007, up from 5.6 million in the three-month period ending in January 2007.⁵⁴⁷ M:Metrics also estimates that 3.6 million U.S. cellphone users accessed a dating service from their mobile phones in March 2007, up from 2.8 million in March 2006.⁵⁴⁸ It is reported that mobile dating services are helping to entice consumers to sign up for the mobile data plans used to browse the Web from their cellphones.⁵⁴⁹

215. With the launch of wireless broadband services based on EV-DO or WCDMA/HSDPA technologies by three of the four nationwide providers and some smaller regional providers, the number of subscribers using mobile data services at broadband-like speeds has also been growing. The Commission estimates that high-speed Internet-access connections using mobile wireless technology increased by more than 18 million in 2006, from 3.128 million connections to 21.910 million connections.⁵⁵⁰ Mobile wireless connections represented approximately 26 percent of the more than 82.547 million high-speed lines in the United States at the end of 2006.⁵⁵¹

216. In contrast with text messaging and other handset-based mobile data applications, subscriber numbers for paging continue to drop. Using NRUF data, we estimate there were 6.1 million paging units in service as of the end of 2006, down from 8.3 million paging units at the end of 2005, 8.5 million units at the end of 2004, 11.2 million units at the end of 2003, and 14.1 million units at the end of 2002.⁵⁵²

⁵⁴⁴ *Telephia: Mobile Video Popularity Reaching New Heights With Triple-Digit Growth in Revenues and Subscribers*, News Release, Telephia, June 26, 2007.

⁵⁴⁵ Li Yuan, *Cellphone Video Gets On the Beam*, WALL STREET JOURNAL, Jan. 4, 2007, at B3.

⁵⁴⁶ Jessica E. Vascellaro, *A Fight Over What You Can Do on a Cellphone*, WALL STREET JOURNAL, June 14, 2007, at A1. See also, *One In Ten Mobile Subscribers Have Music-Capable Phones, But Over the Air Music Purchasing Still Slow To Catch Hold, According to Telephia*, News Release, Telephia, Jan. 8, 2007 (describing survey research showing that 2,004,228 U.S. mobile telephone subscribers, or 8.5 percent of the 23,495,033 subscribers with music players on their handsets, reported any purchases of music via OTA downloads in the third quarter of 2006).

⁵⁴⁷ Jessica E. Vascellaro, *A Fight Over What You Can Do on a Cellphone*, Wall Street Journal, June 14, 2007, at A1.

⁵⁴⁸ Jessica E. Vascellaro, *Finding a Date – on the Spot*, WALL STREET JOURNAL, June 6, 2007, at D1.

⁵⁴⁹ *Id.*

⁵⁵⁰ *High-Speed Services for Internet Access: Status as of December 31, 2006*, Federal Communications Commission, Oct. 2007, Table 1. High-speed lines or wireless channels connect homes and businesses to the Internet at speeds that exceed 200 kbps in at least one direction. *Id.*, at 2.

⁵⁵¹ *Id.*, at 5.

⁵⁵² FCC estimate, based on preliminary year-end 2006 filings for Numbering Resource Utilization in the United States.

2. Minutes of Use

217. Wireless subscribers continue to increase the amount of time they communicate using their wireless phones, although at a slower rate than in previous years. According to CTIA, Average minutes-of-use per subscriber per month (“MOUs”) averaged 714 between June and December 2006, a slight increase from the average of 708 MOUs reported during the same period in 2005.⁵⁵³ For the average subscriber of one of the four nationwide operators MOUs climbed to 848 minutes, or more than 14 hours of use, in the last quarter of 2006.⁵⁵⁴ Both Sprint Nextel and T-Mobile averaged over 1,000 MOUs per month per subscriber for the entire year.⁵⁵⁵

3. Mobile Data Usage

218. Data on the use of handset-based mobile data applications are fragmentary and their availability varies with the particular type of application. By a number of indicators, however, handset-based mobile data applications have continued to gain popularity among U.S. mobile subscribers. For example, the volume of SMS traffic continued to increase at a rapid pace in the past year. According to CTIA, more than 18.7 billion SMS messages were reported for the month of December 2006, an increase of more than 90 percent from the 9.76 billion messages reported for the month of December 2005.⁵⁵⁶ In addition, the reported SMS traffic volume for the period July through December 2006 was 93.8 billion messages, which likewise represents an increase of more than 90 percent from the 48.7 billion messages reported for the second half of 2005.⁵⁵⁷ For 2006 as a whole, total reported text and SMS traffic rose to more than 158 billion messages, nearly double the volume reported in 2005.⁵⁵⁸ While text messaging continues to be the most widely used type of messaging service, the volume of photo messaging and other multimedia messaging services is also growing. In particular, the volume of MMS messages reported to CTIA more than doubled in the past year, rising from 1.1 billion messages in 2005 to 2.7 billion messages in 2006.⁵⁵⁹

219. Mobile technology provider Bango reported in June 2007 that mobile web usage in the United States surged ahead with a threefold increase in the previous twelve months.⁵⁶⁰ According to Bango, the rapid rise in mobile web surfing is driven by the increasing popularity of mobile search as a way of finding new content and services. Bango also credits flat-rate mobile data charges with stimulating the growth of mobile web browsing in the United States.

220. Entertainment applications also continued to grow in popularity. Performance rights organization BMI estimates that U.S. retail sales of mobile phone ringtones grew to \$600 million in calendar year 2006, up from \$500 million in 2005, \$245 million in 2004 and \$68 million in 2003.⁵⁶¹

⁵⁵³ See Table 14: Average Revenue Per Minute, *supra*. CTIA aggregated all of the carriers’ MOUs from July 1 through December 31, then divided by the average number of subscribers, and then divided by six.

⁵⁵⁴ *US Wireless Matrix 1Q07*, at 28.

⁵⁵⁵ *Id.*

⁵⁵⁶ Robert F. Roche and John-Paul Edgette, *CTIA’s Wireless Industry Indices*, CTIA-The Wireless Association, May 2007, at 239.

⁵⁵⁷ *Id.*, at 240.

⁵⁵⁸ *Id.*

⁵⁵⁹ *Id.*

⁵⁶⁰ *Mobile Web Use in the US Surges Ahead With Three Fold Increase in the Last 2 Months*, News Release, Bango, June 5, 2007; COMMUNICATIONS DAILY, June 6, 2007, at 13.

⁵⁶¹ *BMI Projects Downturn in 2007 Ringtone Sales*, News Release, BMI, March 27, 2007.

Sprint Music Store, the first OTA music download service launched in the United States, reached eight million song downloads by its one-year anniversary in October 2006.⁵⁶²

4. Sub-National Penetration Rates

221. NRUF data is collected on a small area basis and thus allows the Commission to compare the spread of mobile telephone subscribership across different areas within the United States.⁵⁶³ EAs, which are defined by the Department of Commerce's Bureau of Economic Analysis, are particularly well-suited for comparing regional mobile telephone penetration rates for two reasons.⁵⁶⁴ First, the defining aspect of mobile telephone is, of course, mobility. Each EA is made up of one or more economic nodes and the surrounding areas that are economically related to the node. The main factor used in determining the economic relationship between the two areas is commuting patterns, so that each EA includes, as far as possible, the place of work and the place of residence of its labor force.⁵⁶⁵ Thus, an EA would seem to capture the market where the average person would shop for and purchase his or her mobile phone most of the time – near home, near the workplace, and all of the places in between. Second, wireless carriers have considerable discretion in how they assign telephone numbers across the rate centers in their operating areas.⁵⁶⁶ In other words, a mobile telephone subscriber can be assigned a phone number associated with a rate center that is a significant distance away from the subscriber's place of residence or usage (but generally still in the same EA).⁵⁶⁷

222. Regional penetration rates for the 172 EAs covering the 50 United States, sorted by EA

⁵⁶² *Nation's First Over-the-Air Song Download Service Celebrates One-Year Anniversary*, News Release, Sprint Nextel, Nov. 1, 2006.

⁵⁶³ NRUF data is collected by the area code and prefix (NXX) level for each carrier, which enables the Commission to approximate the number of subscribers that each carrier has in each of the approximately 18,000 rate centers in the country. Rate center boundaries generally do not coincide with county boundaries. However, for purposes of geographical analysis, the rate center data can be associated with a geographic point, and all of those points that fall within a county boundary can be aggregated together and associated with much larger geographic areas based on counties, for which population and other data exists. Aggregation to larger geographic areas reduces the level of inaccuracy inherent in combining unlike areas such as rate center areas and counties.

⁵⁶⁴ There are 172 EAs, each of which is an aggregation of counties. See Kenneth P. Johnson, *Redefinition of the EA Economic Areas*, SURVEY OF CURRENT BUSINESS, Feb. 1995, at 75 (“*Redefinition of the EA*”). For its spectrum auctions, the FCC has defined four additional EAs: Guam and the Northern Mariana Islands (173); Puerto Rico and the U.S. Virgin Islands (174); American Samoa (175); and Gulf of Mexico (176). See FCC, *FCC Auctions: Maps* (visited Mar. 25, 2002) <<http://wireless.fcc.gov/auctions/data/maps.html>>. In November 2004, the Bureau of Economic Analysis released updated definitions of EAs; however, for consistency, we use the previous release of definitions. See *New BEA Economic Areas For 2004*, Bureau of Economic Analysis, Nov. 17, 2004.

⁵⁶⁵ *Redefinition of the EA*, at 75.

⁵⁶⁶ According to one analyst's report in 2003, wireless carriers assign numbers so as to minimize the access charges paid to local wireline companies. See Linda Mutschler *et al.*, *Wireless Number Portability*, Merrill Lynch, Equity Research, Jan 9, 2003, at 8 (“For wireless operators, the standard practice is to aggregate phone numbers within the same area code onto the same or several rate centers, whose physical locations would result in the least amount of access charges paid to ILECs. Therefore, in each market, wireless operators are present in only a small number of rate centers. According to our industry sources, this percentage is probably below 20%, and could be meaningfully lower than 20%.”).

⁵⁶⁷ “Once the NPA-NXX (i.e., 212-449) is assigned to the wireless carrier, the carrier may select any one of its NPA-NXXs when allocating that number to a particular subscriber. Therefore, with regard to wireless, the subscriber's physical location is not necessarily a requirement in determining the phone number assignment – which is very different from how wireline numbers are assigned.” Linda Mutschler *et al.*, *US Wireless Services: Wireless Number Portability – Breaking Rules*, Merrill Lynch, Equity Research, Feb. 28, 2003, at 3.

penetration rate, can be seen in Appendix A, Table A-3.⁵⁶⁸ In addition, a map showing regional penetration rate by EAs can be found in Appendix B. The rates range from a high of 99 percent⁵⁶⁹ in the Huntsville, AL-TN EA (EA 74) to a low of 50 percent in the San Angelo, TX EA (EA 129).⁵⁷⁰ There are 113 EAs, with a combined population of 262 million, in which penetration rates exceed 70 percent, and 7 EAs, with a combined population of 23 million, in which penetration rates exceed 90 percent. Not only do no EAs have penetration rates under 50 percent, only 9 EAs, with a combined population of just 2 million, have penetration rates under 60 percent. The Anchorage, AK EA (EA 171), with the lowest population density, had a penetration rate of 64 percent, while the Tampa-St. Petersburg-Clearwater, FL EA (EA 34), with the highest density, had a penetration rate of 86 percent. As previously stated, based on an analysis of NRUF data, the national penetration rate is 80 percent.

C. Quality of Service

223. According to the J.D. Power and Associates 2007 Wireless Call Quality Performance Study (Volume 2) released in September 2007, the number of reported wireless call quality problems has declined for a third consecutive reporting period, reaching the lowest levels in the five-year history of the study.⁵⁷¹ The study finds that the number of customer-reported call quality problems is 15 problems per 100 calls, down 29 percent from the same interviewing period in 2006 (21 problems per 100 calls).⁵⁷² Call quality performance has improved considerably with regard to the number of dropped calls, initial disconnects, and interference/static in particular. The number of calls with initial disconnects has declined by 40 percent and the number of dropped calls has declined by 33 percent compared with the previous reporting period in 2007.⁵⁷³

224. The study also finds that wireless customers who use hands-free devices, such as Bluetooth or wired headsets, experience more problems than customers who do not use hands-free devices. In particular, on average hands-free users experience 18 problems per 100 calls, whereas customers who do not use hands-free devices report only 14 problems per 100 calls.⁵⁷⁴ J.D. Power and Associates indicates that the reason for this rating difference is that owners of hands-free devices tend to make calls more frequently than those who do not use these devices, and high-volume callers are more likely to experience call quality problems in general.⁵⁷⁵ J.D. Power and Associates anticipates that the rate of call quality problems may increase as more wireless subscribers begin using hands-free devices

⁵⁶⁸ See also, Appendix B, Map B-45: Mobile Wireless Penetration Estimated by Economic Area, *infra*.

⁵⁶⁹ Penetration rates close to, and over, 100 percent may be due to subscribers having more than one cell phone line.

⁵⁷⁰ We excluded New Orleans, LA-MS (EA 83) from this analysis due to what we believe to be an aberration with the statistics. See note at end of Table A-3: Economic Area Penetration Rates.

⁵⁷¹ *J.D. Power and Associates Reports: Call Quality Problems Experienced With Wireless Services Continue to Decline*, News Release, J.D. Power and Associates, Sept. 6, 2007, at 1 (“2007 Wireless Call Quality Performance Study”). The study measures the number of problems experienced with wireless call quality on a semi-annual basis. Call quality is measured based on seven customer-reported problem areas that impact overall carrier performance: dropped/disconnected calls; static/interference; failed connection on first try; voice distortion; echoes; no immediate voice mail notification; and no immediate text message notification. Problems are measured by the number experienced per 100 calls (PP100), with a lower PP100 score reflecting fewer total problems experienced. The 2007 Wireless Call Quality Performance Study (Volume 2) is based on responses from 25,025 wireless users, and the results are from the two most recent reporting waves, March through April and June through July 2007.

⁵⁷² *Id.*

⁵⁷³ *Id.*

⁵⁷⁴ *Id.*

⁵⁷⁵ *Id.*

due to a rising probability for quality interference between the headset and cellphone.

225. J.D. Power and Associates credits an overall decrease in the number of call quality problems with being the primary factor contributing to an improvement in wireless customer care performance.⁵⁷⁶ According to the J.D. Power and Associates 2007 Wireless Customer Care Performance Study (Volume 2) released in July 2007, wireless customers who experience problems with their service are increasingly reporting that their issues are being resolved in a timely manner. The study finds that 81 percent of the wireless customers who contact their provider with a service issue report having the problem resolved in what they consider to be a “timely manner,” up from just 75 percent in 2004.⁵⁷⁷ In support of the conclusion that the improvement in problem resolution can be attributed primarily to an overall decrease in the number of call quality problems such as dropped calls and coverage problems, J.D. Power and Associates notes that 28 percent of wireless customers with service problems contacted their provider due to call quality issues, down considerably from 48 percent in 2004.⁵⁷⁸

226. According to the results of the J.D. Power and Associates 2007 Wireless Customer Satisfaction Study, call performance and network reliability play an increasingly important role in overall customer satisfaction.⁵⁷⁹ The study finds that the call performance and reliability factor has increased in importance from 26 percent of the overall satisfaction score in 2005 to 32 percent in 2007, with call quality issues such as echoes and timely notification of voice mail messages receiving the most significant increase in importance.⁵⁸⁰ At the same time, customer service has become a less critical factor in determining overall customer satisfaction with mobile telephone service, declining from 17 percent in 2005 to 11 percent in the 2007 study.⁵⁸¹

227. Evidence from other consumer surveys also supports the conclusion that the quality of wireless service continues to improve. For example, the University of Michigan publishes the American Customer Satisfaction Index (“ACSI”), an index measuring customer evaluation of products and services involving 44 industries in 11 sectors, with results updated on a quarterly basis.⁵⁸² The ACSI report for the first quarter of 2007 updated the results for the wireless telephone service industry, finding that customer

⁵⁷⁶ *J.D. Power and Associates Reports: Wireless Carriers Show Steady Improvement in Timeliness of Resolving Customer Care Issues*, News Release, J.D. Power and Associates, Jul. 25, 2007.

⁵⁷⁷ *Id.*

⁵⁷⁸ *Id.*

⁵⁷⁹ *J.D. Power and Associates Reports: Call Quality Plays an Increasingly Important Role in Customer Satisfaction*, News Release, J.D. Power and Associates, Apr. 19, 2007, at 1 (“2007 Wireless Customer Satisfaction Study”). The Wireless Customer Satisfaction Study measures customer satisfaction based on 42 specific service-related measures grouped into six key factors that impact overall wireless carriers’ performance. These six factors are, in order of importance: call performance and reliability (32 percent); brand image (17 percent); cost of service (14 percent); service plan options (14 percent); billing (12 percent); and customer service (11 percent). The 2007 Wireless Customer Satisfaction Study is based on responses from 25,545 wireless users. The results are from two reporting waves, which were conducted in September 2006 and January 2007.

⁵⁸⁰ *Id.*

⁵⁸¹ *Id.*

⁵⁸² *Scores By Industry, All Industries*, The American Customer Satisfaction Index™ <http://www.theacsi.org/index.php?option=com_content&task=view&id=148&Itemid=156> (visited Nov. 13, 2007); *Customer Satisfaction Growth Slows, Many Companies Struggle to Keep Up*, Press Release, The American Customer Satisfaction Index™, May 15, 2007; *ACSI Quarterly Scores*, The American Customer Satisfaction Index™ <http://www.theacsi.org/index.php?option=com_content&task=view&id=13&Itemid=31> (visited Dec. 14, 2007).

satisfaction with the quality of wireless service improved for a second consecutive year, putting the industry at an all time high – up 3 percent to a score of 68 on a 100-point scale.⁵⁸³ Commentary accompanying the report’s release cited better quality of service and greater consumer choice as the reasons for improvement in the industry, and noted that because of number portability wireless service companies are working harder to retain customers. It also observed, however, that early termination fees and the need for handset replacement when signing up with a new provider “allow the industry to continue with lackluster customer satisfaction,” such that wireless service remains one of the lower scoring industries in the ACSI.⁵⁸⁴

D. International Comparisons

1. Mobile Voice

228. This section compares mobile market performance in the United States, Western Europe and Asia-Pacific countries of comparable income levels with regard to mobile penetration, usage, and pricing.⁵⁸⁵ To ensure that a consistent methodology is used to compile the data for different countries, the comparison is based on international cross-section data compiled by Merrill Lynch.⁵⁸⁶ Consequently, the estimates of mobile penetration, MOUs, and revenue per minute for the U.S. mobile market cited in this section differ somewhat from estimates provided in previous sections of the report because they come from different sources.⁵⁸⁷

229. In the *Eleventh Report*⁵⁸⁸ and previous reports, this comparison has consistently shown

⁵⁸³ *Customer Satisfaction Growth Slows, Many Companies Struggle to Keep Up*, Press Release, The American Customer Satisfaction Index™, May 15, 2007.

⁵⁸⁴ Professor Claes Fornell, Director of the University of Michigan’s National Quality Research Center (which collects and analyzes ACSI data), *First Quarter, 2007, Utilities; Transportation & Warehousing; Information; Health Care & Social Assistance; Accommodations & Food Services, Commentary by Professor Claes Fornell*, The American Customer Satisfaction Index™ <http://www.theacsi.org/index.php?option=com_content&task=view&id=169&Itemid=168> (visited Nov. 13, 2007). Although wireless telephone service received the fifth lowest score among the 44 industries that are covered in the ACSI, it scored near the average of the nine industries in the “Information Sector” in which it is classified (68.3), beating out cable and satellite television (62), newspapers (66), network/cable television news (67), and broadcasting television news (67). See *Scores By Industry, All Industries*, The American Customer Satisfaction Index™ <http://www.theacsi.org/index.php?option=com_content&task=view&id=148&Itemid=156> (visited Nov. 13, 2007); *ACSI, Q1 2007 and Q1 2007 and Historical ACSI Scores*, The American Customer Satisfaction Index™, <http://www.theacsi.org/index.php?option=com_content&task=view&id=171&Itemid=170> (visited Dec. 17, 2007).

⁵⁸⁵ In accordance with established practice in using international benchmarking to assess effective competition in mobile markets, the comparison of mobile market performance is restricted to Western Europe and parts of the Asia-Pacific in order to ensure that the countries being compared are roughly similar to the United States with regard to their level of economic and telecommunications infrastructure development. See, for example, UK regulator Oftel’s review of effective competition in the mobile market: *Effective Competition Review: Mobile*, Office of Telecommunications, Feb. 2001, at 7.

⁵⁸⁶ *Interactive Global Wireless Matrix 4Q06*.

⁵⁸⁷ In addition, Merrill Lynch has noted that these data have certain limitations for comparing countries that use calling party pays (“CPP”) versus mobile party pays (also known as receiving party pays). For reasons explained below, the figures for minutes of use may be somewhat understated, and the revenue figures used to calculate average revenue per minute may be somewhat overstated, in markets where CPP is used relative to non-CPP markets.

⁵⁸⁸ *Eleventh Report*, at 11020-11021.

that mobile penetration is higher in Western Europe and developed Asia-Pacific countries than in the United States. In this report, however, we find this is no longer the case. In particular, although mobile penetration is still higher in most Western European and developed Asia-Pacific countries than in the United States, the increase in the number of U.S. mobile telephone subscribers in 2006 raised the nationwide penetration rate to a level that is virtually on a par with mobile penetration rates in Japan and France. In other respects, the findings of this section are consistent with those in previous reports. Thus, the United States still leads the world in average minutes of use per subscriber, and mobile calls continue to be significantly less expensive on a per minute basis in the United States than in Western Europe and Japan.

**Table 16: Mobile Market Structure and Performance
in Selected Countries**

Country	Number of Players	Penetration (%)	Prepaid (% of Subs)	MOUs	Revenue per Minute (\$)	Data (% of ARPU)
Mobile Party Pays						
USA	4+	77	14	838	0.05	12
Canada	3	58	23	420	0.12	10
Hong Kong	5	108	76	460	0.04	9
Singapore	3	106	39	338	0.08	22
Calling Party Pays						
UK	5	117	66	154	0.15	24
Germany	4	104	53	94	0.24	21
Italy	4	138	90	117	0.22	19
Sweden	4	116	54	164	0.16	7
France	3	79	35	254	0.16	15
Finland	3	114	19	304	0.11	14
Japan	3	78	3	145	0.26	29
South Korea	3	83	3	316	0.11	19
Australia	4	98	50	193	0.16	21

Source: *Interactive Global Wireless Matrix 4Q06*.

230. Mobile penetration averaged an estimated 111 percent in Western Europe at the end of 2006.⁵⁸⁹ In most West European countries, estimated mobile penetration exceeded 100 percent at the end of 2006, due in part to greater use of prepaid service plans and ownership of multiple devices or subscriber identity module (“SIM”) cards.⁵⁹⁰ As in years past, France finished 2006 with the lowest

⁵⁸⁹ *Interactive Global Wireless Matrix 4Q06*.

⁵⁹⁰ *Id.* Reported mobile subscriber figures and therefore penetration may be overstated in some countries, particularly those with a high percentage of prepaid subscribers, due to a combination of factors: (1) slow clearing out of inactive users (for example, subscribers who have switched service providers) from their former provider’s subscriber base; (2) multiple device ownership (for example, users of a Blackberry plus a mobile phone); and (3) multiple SIM card ownership (for example, users who switch between operators in order to take advantage of different tariffs at different times of the day or week). See Jeff Kvaal *et al.*, *Wireless Equipment Industry Update: Strong Net Adds Drive Higher Phone Units*, Lehman Brothers, Equity Research, Jan. 16, 2007, at 4. As noted in previous reports, carriers have widely different policies to determine when to cut off inactive subscribers and to remove them from their reported subscriber base. In addition, it is becoming more prevalent for people to subscribe to multiple mobile service providers. See, e.g., *Eleventh Report*, at 11021, note 506; *Tenth Report*, at 15976, note 452; *Seventh Report*, at 13033, and *Sixth Report*, at 13391.

mobile penetration rate in Western Europe at 79 percent.⁵⁹¹

231. Japan finished 2006 with a mobile penetration level of 78 percent.⁵⁹² Year-end mobile penetration rates in a number of other Asian-Pacific countries were within the range of European levels, including Australia (98 percent), South Korea (83 percent), Hong Kong (108 percent), and Singapore (106 percent).⁵⁹³

232. Merrill Lynch's estimate of U.S. mobile penetration at the end of 2006, at approximately 77 percent,⁵⁹⁴ was slightly lower than estimated rates in Japan and France, the country with the lowest mobile penetration rate in Western Europe. Taking into account that our NRUF-based estimate of the number of U.S. mobile telephone subscribers at the end of 2006 puts the nationwide penetration rate at 80 percent,⁵⁹⁵ we conclude that mobile penetration in the United States is now virtually on a par with levels in Japan and France.

233. The United States maintained its lead in mobile voice usage in 2006, with average MOUs estimated to be approximately 838 per month in the fourth quarter of 2006.⁵⁹⁶ This compares with an average across Western Europe of approximately 150 MOUs, and estimates in individual countries that range from a low of 94 in Germany to a high of 304 in Finland.⁵⁹⁷ MOUs in comparable Asian-Pacific countries were generally higher than the Western European average, but still well below the U.S. figure, including Australia (193), South Korea (316), Hong Kong (460), and Singapore (338).⁵⁹⁸ MOUs in Japan, at 145, were slightly below the Western European average.⁵⁹⁹

234. As noted above, some analysts regard average revenue per minute as a good proxy for mobile pricing.⁶⁰⁰ Revenue per minute in Western Europe averaged about \$0.20 in the fourth quarter of

⁵⁹¹ *Interactive Global Wireless Matrix 4Q06.*

⁵⁹² *Id.*

⁵⁹³ *Id.*

⁵⁹⁴ *Id.*

⁵⁹⁵ Merrill Lynch estimates that the number of mobile telephone subscribers in the United States was approximately 233.04 million in December 2006, as compared with our estimate of 241.8 million based on NRUF. *Id.*

⁵⁹⁶ *Id.* For purposes of comparing metrics in different countries, average MOUs include both incoming and outgoing minutes, and usually exclude traffic related to mobile data services. Figures for MOUs are potentially somewhat understated in markets that employ CPP as compared to the U.S. mobile market and other non-CPP markets due to double-counting of same-network ("on-net") mobile-to-mobile minutes under the mobile party pays system used in the U.S. and other non-CPP markets. The double counting occurs because each minute of an on-net call is billed to both the caller and the receiver under the mobile party pays system, whereas under CPP each on-net minute is billed only to the calling party, and therefore counted only once. *See Tenth Report*, at 15976, note 457.

⁵⁹⁷ *Interactive Global Wireless Matrix 4Q06.*

⁵⁹⁸ *Id.*

⁵⁹⁹ *Id.*

⁶⁰⁰ *See* Section VI.A.1, Pricing Trends, *supra*. Average revenue per minute ("RPM") is calculated by dividing monthly voice-only ARPU by MOUs. Service revenues included in ARPU reflect the fees mobile operators collect from other network operators for terminating incoming calls on their networks as well as monthly service charges and usage fees paid by mobile subscribers. As noted above, MOUs figures may be somewhat understated in CPP markets relative to non-CPP markets (due to the aforementioned double-counting of on-net mobile-to-mobile minutes in non-CPP markets), and the revenue figures used to calculate ARPU may be somewhat overstated in CPP markets relative to non-CPP markets (due to double-counting of mobile termination revenues for off-net mobile-to-mobile calls in CPP markets). Consequently, the RPM figures (ARPU divided by MOUs) probably overstate the (continued....)

2006, and ranged from a low of \$0.11 in Finland to a high of \$0.33 in Switzerland, with most countries clustered in the range between \$0.15 and \$0.24.⁶⁰¹ At \$0.05, average revenue per minute in the United States during the same period remained less than one-third of the European average despite significant declines in most Western European countries.⁶⁰² Revenue per minute in Japan, at \$0.26, was five times the U.S. figure at the end of 2006 and also higher than the European average, but lower than the European high of \$0.33 in the Swiss mobile market.⁶⁰³ Revenue per minute in most other comparable Asian-Pacific markets was significantly lower than the Western European average but higher than the U.S. figure, including Australia (\$0.16), South Korea (\$0.11) and Singapore (\$0.08).⁶⁰⁴ At \$0.04, Hong Kong continues to have the only comparable mobile market with lower revenue per minute than the United States.⁶⁰⁵

235. One of the reasons revenue per minute is higher in Western Europe and Japan than in the United States is that the calling party pays system used throughout Western Europe and in Japan tends to give mobile operators the ability and the incentive to set mobile termination charges that are high relative to those in the United States and other countries that use the mobile party pays system.⁶⁰⁶ In addition, because these higher mobile termination charges are absorbed by the calling party, the calling party pays system may also reduce usage relative to mobile party pays system by increasing the cost of calls to mobile phones.⁶⁰⁷ Based on a regression analysis of international cross-section data for countries with high per capita income, economist Stephen Littlechild finds that a mobile party pays system significantly reduces average revenue per minute (by about twelve cents per minute compared to a calling party pays system), while significantly increasing average usage (by about 143 minutes per month).⁶⁰⁸

236. Apart from the effects of a calling party pays system on mobile termination charges, analysts have argued that intense competition led U.S. mobile operators to price aggressively through bucket plans and various promotions, driving prices down well below levels in Western Europe and

(Continued from previous page) _____

difference between RPM in the United States and CPP markets. The potential for service revenues to be somewhat overstated in CPP markets was brought to the Commission's attention by Professor Stephen Littlechild, and confirmed by Merrill Lynch through email correspondence.

⁶⁰¹ *Interactive Global Wireless Matrix 4Q06*.

⁶⁰² *Id.* In email correspondence, Merrill Lynch has indicated that RPM figures may overstate the difference between RPM in CPP and non-CPP markets by about 15 percent due to the two factors mentioned above.

⁶⁰³ *Id.*

⁶⁰⁴ *Id.*

⁶⁰⁵ *Id.*

⁶⁰⁶ See, for example, Robert W. Crandall and J. Gregory Sidak, *Should Regulators Set Rates to Terminate Calls on Mobile Networks?*, YALE JOURNAL ON REGULATION, Vol. 21, No. 2, Summer 2004, at 1-46, at 6-8; Stephen C. Littlechild, *Mobile Termination Charges: Calling Party Pays Versus Receiving Party Pays*, TELECOMMUNICATIONS POLICY, Vol. 30, No. 5-6, June-July 2006, at 242-277, at 244-245, 253-254 (“*Calling Party Pays Versus Receiving Party Pays*”).

⁶⁰⁷ *Calling Party Pays Versus Receiving Party Pays*, at 255. While theory also suggests the possibility that mobile party pays may lead mobile subscribers to switch off their phones or withhold their mobile phone numbers to avoid paying for incoming calls, in practice U.S. mobile operators have overcome the disincentive to receive calls under mobile party pays through the introduction of bucket plans with low per-minute rates and other schemes for stimulating usage, such as free night and weekend minutes. *Id.*, at 254, 268.

⁶⁰⁸ *Id.*, at 259. Littlechild also concludes there is no evidence that mobile party pays lowers the mobile penetration rate compared to calling party pays. *Id.*

Japan.⁶⁰⁹ Accordingly, the results of this international comparison can be interpreted as evidence that the U.S. mobile market is effectively competitive relative to mobile markets in Western Europe and also Japan.

2. Mobile Data

237. The percentage of mobile service revenues from data services continues to be higher in Western Europe and parts of Asia than in the United States.⁶¹⁰ In the fourth quarter of 2006 revenues from mobile data services contributed an estimated 18 percent of European mobile carriers' service revenues on average, and ranged from a low of 7 percent of service revenues in Sweden to a high of 24 percent of service revenues in the UK.⁶¹¹ This compares with 12 percent of U.S. mobile carriers' service revenues in the same period, up from 9.6 percent at the end of 2005.⁶¹² The percentage of service revenues derived from mobile data services was even higher in Japan (29 percent), Singapore (22 percent), Australia (21 percent), and South Korea (19 percent) than in Western Europe on average.⁶¹³

238. Text messaging is still the most popular mobile data service in Western Europe as well the United States,⁶¹⁴ and it continues to be far more widely used by mobile subscribers in Western Europe.⁶¹⁵ As noted above, it is estimated that about 39 percent of U.S. mobile subscribers sent a text message in the three-month period ending January 31, 2007.⁶¹⁶ This compares with about 86 percent of Italian, Spanish, and U.K. mobile subscribers, 81 percent of German mobile subscribers, and nearly 74 percent of French mobile subscribers who sent a text message during the same period.⁶¹⁷

239. As explained in the *Eleventh Report* and previous reports, one reason a much higher percentage of European mobile subscribers use text messaging is that mobile voice calls are still relatively expensive on a per minute basis in European mobile markets, and sending a text message is generally cheaper than placing a call on a mobile phone.⁶¹⁸ In contrast, most U.S. mobile subscribers are on calling plans that include large buckets of minutes plus unlimited free night and weekend minutes. These bucket plans create a disincentive to send text messages because the incremental cost of a mobile voice call is close to zero, whereas there is usually an additional charge for sending a text message.

240. The *Eleventh Report* noted that photo messaging is also more widely used by mobile

⁶⁰⁹ See, e.g., Timothy Horan *et al.*, *International Wireless Trends Reinforce Our Bullish View On U.S. Wireless*, CIBC World Markets, Equity Research, June 6, 2005, at 4-6.

⁶¹⁰ See *Eleventh Report*, at 11023.

⁶¹¹ *Interactive Global Wireless Matrix 4Q06*.

⁶¹² *Id.*; *Eleventh Report*, at 11023.

⁶¹³ *Interactive Global Wireless Matrix 4Q06*.

⁶¹⁴ *M:Metrics: Mobile Music Usage is Climbing, But Not All Musicphones are Created Equal*, News Release, M:Metrics, Mar. 21, 2007, at 3-5.

⁶¹⁵ See *Eleventh Report*, at 11023, for international comparisons of text messaging in the first quarter of 2006. See also, *Wireless Data: Just Getting Started*, at 14 (noting that SMS accounts for only 40 percent of data revenues in the United States, whereas SMS accounts for roughly two-thirds of wireless data revenues worldwide).

⁶¹⁶ See Section VI.A.1.b, *Mobile Data*, *supra*.

⁶¹⁷ *M:Metrics: Mobile Music Usage is Climbing, But Not All Musicphones are Created Equal*, News Release, M:Metrics, Mar. 21, 2007, at 3-4.

⁶¹⁸ *Eleventh Report*, at 11024.

subscribers in Europe than in the United States,⁶¹⁹ and this continues to be the case. As noted above, it is estimated that nearly 15 percent of U.S. mobile subscribers used photo messaging in the three-month period ending January 13, 2007.⁶²⁰ This compares with an estimated 32 percent of Italian mobile subscribers, 30 percent of U.K. mobile subscribers, 28 percent of Spanish mobile subscribers, 21 percent of French mobile subscribers, and 20 percent of German mobile subscribers who used photo messaging during the same period.⁶²¹

241. Apart from text and photo messaging, survey evidence reveals little difference between the rates at which mobile subscribers in the United States and Western Europe are adopting various other mobile data applications. Mobile subscribers in the U.K. use their cellphones to browse news and information at a somewhat higher rate (14 percent) than subscribers in the United States (10 percent) and other Western European countries (less than 10 percent in Italy, Spain, France, and Germany).⁶²² For the remaining mobile data applications survey respondents were asked about, including ringtones, games, instant messaging and email, adoption rates generally remained below 10 percent in all these countries.⁶²³

242. In a 2007 survey focusing exclusively on mobile web browsing behavior, mobile media research firm M:Metrics found that weather is the top category of news and information accessed by U.S. mobile subscribers (4.7 percent of subscribers), whereas European prefer to view sports information on their cellphones (3.3 percent of subscribers).⁶²⁴ Apart from this difference, M:Metrics found “wide similarities in the browsing behaviors of Europeans and Americans,” and concluded that “With the exception of the American penchant for weather and the European zeal for sports information, there are few variances in the type of information sought via mobile, despite the relative maturity of the European market.”⁶²⁵ The results of this survey also indicate that the percentage of mobile subscribers who use their cellphones to browse the mobile Web for news and information is slightly higher in the United States (10.7 percent) than in Europe (8.8 percent), and that a higher percentage of U.S. mobile subscribers use their cellphones for mobile web browsing in each individual category of information investigated, including sports, news, entertainment, maps and directions, financial account access, financial news, business directories and travel.⁶²⁶

243. As noted in the *Eleventh Report*, although early 3G licensing gave European operators a

⁶¹⁹ See *Eleventh Report*, at 11024.

⁶²⁰ See Section VI.A.1.b, *Mobile Data*, *supra*.

⁶²¹ *M:Metrics: Mobile Music Usage is Climbing, But Not All Musicphones are Created Equal*, News Release, M:Metrics, Mar. 21, 2007, at 3-4.

⁶²² *Id.* See also, *Mobile Web Use in the US Surges Ahead With Three Fold Increase in Last 12 Months*, News Release, Bango, June 5, 2007 (reporting that the top two countries accessing the mobile web via Bango in April 2007 were the UK at 27 percent followed by the U.S. at 21 percent).

⁶²³ *M:Metrics: Mobile Music Usage is Climbing, But Not All Musicphones are Created Equal*, News Release, M:Metrics, Mar. 21, 2007, at 3-4.

⁶²⁴ *M:Metrics – Weather Information is Most Popular Among American Mobile Subscribers, While Europeans Prefer Browsing Sports Information on Mobile Web*, News Release, M:Metrics, Jul. 24, 2007. The survey results are based on a three-month moving average for the period ending May 31, 2007, and are based on a survey of 70,649 respondents in the EU (UK, Germany, France, Spain and Italy) and 33,810 respondents in the United States. The results do not include subscribers who browse to download certain mobile content such as ringtones, games, graphics, or music, to access email or instant messaging via their browser, and those that access adult content or gambling sites.

⁶²⁵ *Id.*, at 1.

⁶²⁶ *Id.*

head start in the deployment of next-generation networks based on WCDMA technology, it has been argued that the superior next-generation technologies deployed by U.S. wireless providers had given the United States an edge over Europe in wireless data networks for the first time in years by the beginning of 2006.⁶²⁷ In particular, the speeds on the EV-DO networks deployed by Verizon Wireless, Sprint Nextel, and other U.S. CDMA providers are much faster than the speeds on European WCDMA networks.⁶²⁸ Moreover, in December 2005, U.S. operator Cingular became the first carrier in the world to launch a commercial WCDMA/HSDPA network, which provides speeds more similar to EV-DO.⁶²⁹ Since early 2006, most Western European mobile operators have begun upgrading their WCDMA networks through deployment of HSDPA and have commercially launched WCDMA/HSDPA networks.⁶³⁰ At the same time, however, the two nationwide CDMA carriers in the United States have been rolling out EV-DO Rev. A, which offers superior speeds than WCDMA/HSDPA. As in the case of Western Europe, WCDMA/HSDPA networks were commercially launched in a number of Asian-Pacific mobile markets in 2006, including Japan, South Korea, Australia, Singapore, and Taiwan.⁶³¹ Whereas all mobile operators in Western Europe are deploying WCDMA and WCDMA/HSDPA as their next-generation network technology, WCDMA and WCDMA/HSDPA networks compete with EV-DO networks in some Asian-Pacific markets, including Japan and South Korea.⁶³²

VII. INTERMODAL ISSUES

A. Wireless – Wireline Competition

244. Once solely a business tool, wireless phones are now a mass-market consumer device.⁶³³ As one analyst noted in early 2007: “Cellphones rank just behind keys when it comes to items that Americans don’t leave home without.”⁶³⁴ The overall wireless penetration rate in the United States is now at 80 percent,⁶³⁵ and virtually everyone in the United States between the ages of 15 and 69 has a wireless phone.⁶³⁶ Even among the very young, an estimated 51 percent of children aged 10 to 14 years

⁶²⁷ *Eleventh Report*, at 11025, citing Walter S. Mossberg, *Cingular Joins Rivals With Fast, Reliable Wireless Broadband*, WALL STREET JOURNAL, Jan. 19, 2006, at A9.

⁶²⁸ *Id.*

⁶²⁹ *Id.*

⁶³⁰ *Global UMTS and HSPA Operator Status*, Informa Telecoms & Media, WCIS, and 3G America, May 23, 2007, available at www.3gamericas.org/pdfs/Global_3G_Status_Update.pdf.

⁶³¹ *Id.*

⁶³² *3G Operators*, 3G TODAY (visited June 13, 2007) <www.3gtoday.com>.

⁶³³ See *Sixth Report*, at 13381. See also, *10-Year Wireless Projections*, KAGAN WIRELESS TELECOM INVESTOR, June 6, 2005, at 2 (estimating that, in 2004, only 25 percent of wireless users were business customers, with the remaining 75 percent being ordinary consumers).

⁶³⁴ Marguerite Reardon, *Will ‘Unlocked’ Cellphones Consumers?*, USATODAY.COM (citing Albert Lin, an analyst with American Technology Research).

⁶³⁵ See Section VI.B.1, *Subscriber Growth*, *supra*.

⁶³⁶ Simon Flannery *et al.*, *Deteriorating Wireless Trends, Revisited*, Morgan Stanley, Equity Research, Jan. 18, 2007, at 5. The authors add that “the inescapable conclusion is that the population aged 20-69 must be already highly penetrated.”

old, and 25 percent of children aged 5 to 9 years old, have cellphones.⁶³⁷

245. Mobile phones are everywhere, an integral part of American culture. One reporter commented, “Cell phones are the most pervasive media device, beating out computers and televisions, as consumers keep their mobile phones at their side nearly every moment of the day.”⁶³⁸ Wireless phones have even become a fashion accessory:

The CTIA Wireless Association hosts fashion shows at its conventions. Runway models parade around with cutting-edge phones and accessories. . . . Consumers surveyed last year by the [consulting firm] Yankee Group placed “style or look” high on a list of the most important factors in choosing a phone, behind only price and ease of use but above battery life and technical considerations.⁶³⁹

1. Wireless Substitution

246. While exact percentages are difficult to determine, wireless substitution has grown significantly in recent years. Between the end of 2001 and 2006, total RBOC access lines dropped 23 percent, from 161 million to 124 million lines.⁶⁴⁰ In 2006 alone, the RBOCs lost almost 7 percent of their wireline access lines, with wireless substitution being a significant reason.⁶⁴¹ According to the 2006 National Health Interview Survey (“NHIS”), 11.8 percent of adults, or one out of every 8, lived in households with only wireless phones in the second half of 2006, up from 7.8 percent in the second half of 2005, and triple the percentage (3.5 percent) in the second half of 2003.⁶⁴² The survey also found that wireless-only households are more prevalent among younger adults, with one-half of all wireless-only adults under 30 years of age. One in four adults aged 18-24 years (25.2 percent) lived in households with only wireless telephones, and nearly 30 percent of adults aged 25-29 years lived in households with only wireless telephones. Above 30 years old, as age increased, the survey found that the percentage of adults living in households with only wireless telephones decreased: 12.4 percent for adults aged 30-44 years; 6.1 percent for adults aged 45-64 years; and 1.9 percent for adults aged 65 years or over.

⁶³⁷ *Id.*

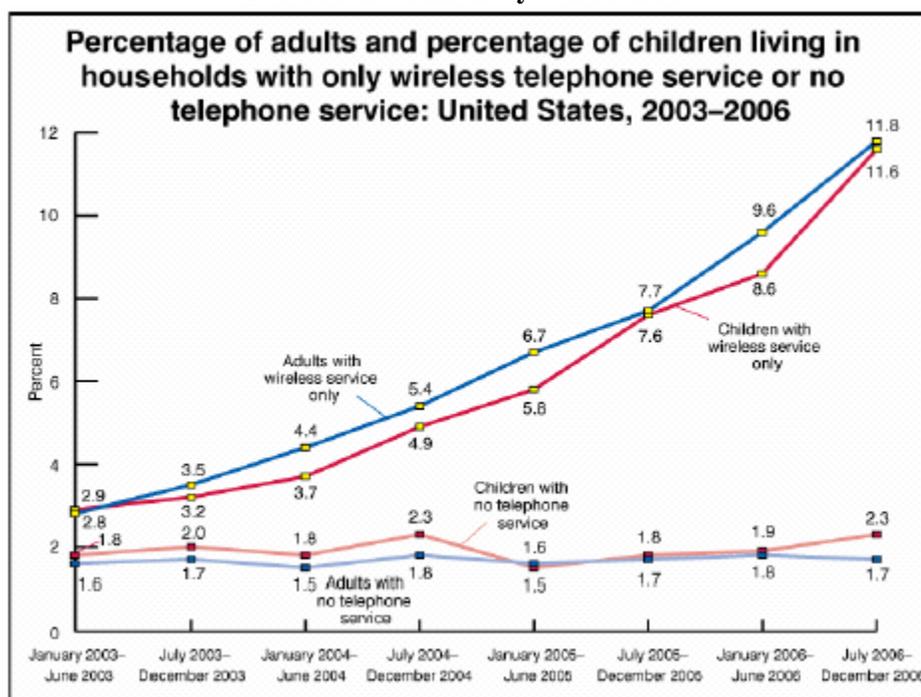
⁶³⁸ Louise Story, *Cell Phone Carriers Planning Screen Ads*, CHICAGO TRIBUNE ONLINE, Jan. 22, 2007.

⁶³⁹ Edward C. Baig, *Cellphones Hit Fashion's Runway As Accessories*, USA TODAY, May 3, 2007.

⁶⁴⁰ Simon Flannery, *et al.*, *Telecom Services 4Q06 Preview/2007 Outlook: Is Telecom Back for Good?*, Morgan Stanley, Equity Research, Jan. 24, 2007, at 7-8.

⁶⁴¹ Jason Armstrong, *et al.*, *The Quarter in Pictures: 3Q2006 US Telecom Services Review*, Goldman Sachs, Equity Research, Nov. 2006, at 6 (wireless substitution being a key reason for many companies line losses); Simon Flannery, *et al.*, *Telecom Services 4Q06 Preview/2007 Outlook: Is Telecom Back for Good?*, Morgan Stanley, Equity Research, Jan. 24, 2007, at 7 (percent of line loss).

⁶⁴² Stephen J. Blumberg, Ph.D., and Julian V. Luke, *Wireless Substitution: Early Release of Estimates Based on Data from the National Health Interview Survey, July – December 2006*, National Center for Health Statistics, Centers for Disease Control, available at <<http://www.cdc.gov/nchs/data/nhis/earlyrelease/wireless200705.pdf>> (visited July 26, 2007) (“Dec. 2006 NHIS”).

Chart 3: Wireless-Only Households⁶⁴³

247. The results of online polling conducted between October and December 2006 by Harris Interactive found similar results. According to the Harris polls, 11 percent of U.S. adults use only cellphones, compared with 12 percent in the NHIS survey.⁶⁴⁴ The Harris polling also found that younger adults are more likely to be wireless only, with over half of U.S. adults who only use a cellphone being under 30 (compared to 22 percent of U.S. adults in that age group).⁶⁴⁵

248. In the last half of 2006, according to the NHIS survey, 12.8 percent of households (as opposed to adults) were wireless-only, up from 8.4 percent at the end of 2005, and 4.2 percent at the end of 2003.⁶⁴⁶ Among the 20 largest U.S. cities, Detroit and Minneapolis-St. Paul have the highest rates of wireless substitution by households, at 19 percent and 15.2 percent, respectively.⁶⁴⁷ Tampa, FL came in a close third with 15.1 percent.⁶⁴⁸ Other cities where people have been replacing their landlines with wireless at rates greater than 10 percent include Washington, D.C.; Phoenix, AZ; Atlanta, GA; Denver, CO; and Seattle, WA.⁶⁴⁹

249. These trends appear to be due to the relatively low cost, widespread availability, and increased use of wireless service. As we discussed in past reports, a number of analysts have argued that

⁶⁴³ Dec. 2006 NHIS

⁶⁴⁴ *Cell Phones Widely Used by Those Under 30*, CELLULAR-NEWS, Jun. 8, 2007.

⁶⁴⁵ *Id.*

⁶⁴⁶ Dec. 2006 NHIS

⁶⁴⁷ Kelly Hill, *Detroit Tops In Wireline Replacement Among Largest Markets*, RCR WIRELESS, Oct. 18, 2006 (citing research by Telephia).

⁶⁴⁸ *Id.*

⁶⁴⁹ *Id.*

wireless service is competitive or cheaper than wireline, particularly if one is making a long-distance call or when traveling.⁶⁵⁰ As one analyst wrote, “At currently effective yields, we continue to believe wireless pricing is competitive with traditional wireline pricing. Lower yields, combined with the convenience of mobility, should continue to drive wireline displacement.”⁶⁵¹

2. Wireless Alternatives

250. A number of mobile wireless providers offer service plans designed to compete directly with wireline local telephone service. Many of these providers offer plans with unlimited local calling for around \$30 to \$40 a month. The two largest such providers, Leap, under its “Cricket” brand, and MetroPCS, served a combined total of 5.1 million customers at the end of 2006.⁶⁵² Leap offers service in markets in 23 states,⁶⁵³ while MetroPCS offers service in certain major metropolitan areas in California, Florida, Georgia, Texas, and Michigan.⁶⁵⁴

251. In addition to unlimited local wireless calling plans, many operators, including the nationwide carriers, offer plans of large buckets of minutes, with around 1,000 “anytime” minutes and unlimited night and weekend minutes (some with free “in-network” calling), for around \$60 per month.⁶⁵⁵

B. Wireless Local Area Networks and Wireless-Wireline Convergence

252. Wireless local area networks (“WLANs”) are playing an increasingly important role as a competitor and supplement to the services offered by the CMRS industry.⁶⁵⁶ WLANs are widely deployed and enable consumers to obtain high-speed wireless Internet connections within a range of 150 to 250 feet from a wireless access point. The most prevalent WLAN technology is equipment manufactured in accordance with the IEEE 802.11 family of standards, commonly known as “Wi-Fi,” short for wireless fidelity. Basic WLAN data transfer rates range from speeds of up to 11 Mbps for 802.11b and up to 54 Mbps for 802.11a and 802.11g.

253. WLAN users can access high-speed Internet connections at so-called “hot spots,” including locations such as restaurants, coffee shops, hotels, airports, convention centers, and city

⁶⁵⁰ See *Eighth Report*, at 14832-14833; *Ninth Report*, at 20684-20685; *Tenth Report*, at 15980; *Eleventh Report*, at 11027-11028.

⁶⁵¹ *4Q06 Wireless 411*, at 47.

⁶⁵² *Leap Reports More than 260,000 Net Customer Additions in the Fourth Quarter and Completes Launch of Approximately 20 Million Covered POPs by Year End*, News Release, Leap, Feb. 27, 2007 (2.2 million subscribers); MetroPCS, *Investor Overview* (visited July 26, 2007) <<http://investor.metropcs.com/phoenix.zhtml?c=177745&p=irol-IRHome>> (2.9 million subscribers).

⁶⁵³ *Leap Announces Launch of Cricket Service in Raleigh-Durham, North Carolina*, News Release, Leap, June 26, 2007.

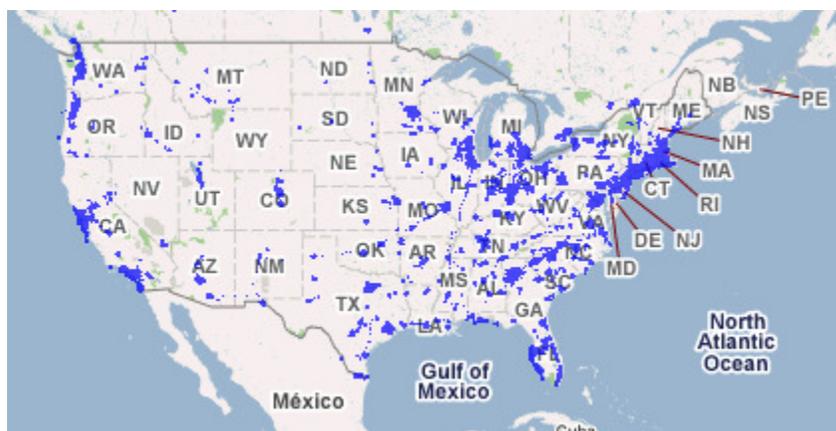
⁶⁵⁴ See MetroPCS, *Find Your Coverage Area* (visited July 26, 2007) <<http://www.metropcs.com/coverage/coverageareas.php?currentNav=none>>.

⁶⁵⁵ See, e.g., T-Mobile, *All Plans* (visited July 26, 2007) <<http://www.t-mobile.com/>>; AT&T, *Rate Plans* (visited July 26, 2007) <<http://www.wireless.att.com/>>; Verizon Wireless, *America's Choice Basic* (visited July 26, 2007) <<http://www.verizonwireless.com/>>; and, Sprint Nextel, *Sprint Power Pack Plans* (visited July 26, 2007) <<http://www.sprint.com/>>. In addition, T-Mobile offers regional plans with 3,000 “Whenever” minutes for \$50 a month. T-Mobile, *All Plans* (visited July 26, 2007) <<http://www.t-mobile.com/>>.

⁶⁵⁶ Services provided over WLANs are not CMRS services. See 47 C.F.R. §§ 20.3, 20.9 for a discussion of commercial mobile radio services. WLANs are permitted to operate on an unlicensed basis under Part 15 of the FCC's rules. See 47 C.F.R. §15, et seq.

parcs.⁶⁵⁷ Estimates of the number of public Wi-Fi hot spots in the United States vary considerably, ranging from just under 14,000 to over 63,000.⁶⁵⁸ In addition to public hot spots, WLANs are also proliferating in homes and businesses.⁶⁵⁹ One company, Skyhook Wireless (“Skyhook”), is using Wi-Fi access points, as an alternative to GPS systems, to determine the location of end users and develop various location-based services.⁶⁶⁰ Skyhook’s Wi-Fi Positioning System (“WPS”) platform tracks the existence of Wi-Fi access points and can be used to identify, within 20 meters, the location of any Wi-Fi enabled device.⁶⁶¹

Map 4: Skyhook US Coverage⁶⁶²



254. Several mobile telephone providers have entered the hot spot operation business through acquisitions, partnerships, or independent deployments.⁶⁶³ For instance, T-Mobile offers Wi-Fi access at nearly 8,500 HotSpot-branded locations in the United States, while Sprint Nextel’s Wi-Fi network includes more than 8,000 hot spot locations across North America.⁶⁶⁴ AT&T offers Wi-Fi connectivity at

⁶⁵⁷ See *Seventh Report*, at 13062-13063. Hot spots typically rely on high-speed landline technologies, such as T-1 lines, DSL, or cable modems, to connect to the Internet.

⁶⁵⁸ See WiFi411, *Top 10 Wi-Fi Countries* (visited Nov. 14, 2007) <<http://www.wifi411.com/>> (13,760 hot spots); Jiwire, *Wi-Fi Hot Spot Directory* (visited Nov. 14, 2007) <http://www.jiwire.com/hot-spot-directory-browse-by-state.htm?country_id=1&provider_id=0> (63,770 hot spots).

⁶⁵⁹ Off-the-shelf, “plug-and-play” WLAN network equipment sold by companies such as Linksys and Netgear has allowed consumers to easily extend the reach of their wireline broadband connections and enabled portability within and around the home.

⁶⁶⁰ Skyhook Wireless, *How It Works* (visited Nov. 14, 2007) <<http://www.skyhookwireless.com/howitworks/>>.

⁶⁶¹ *Id.*

⁶⁶² Skyhook Wireless, <http://www.skyhookwireless.com/howitworks/coverage.php> (visited Nov. 13, 2007).

⁶⁶³ *Ninth Report*, at 20687.

⁶⁶⁴ *T-Mobile Introduces Unlimited Calling Over Wi-Fi With the National Launch of T-Mobile HotSpot@Home*, News Release, T-Mobile, June 27, 2007 (“*T-Mobile Introduces Unlimited Calling Over Wi-Fi With HotSpot@Home*”); Sprint Nextel, *Unlimited WiFi HotSpot Plan* (visited Nov. 14, 2007) http://www.nextel.com/en/solutions/dataaccess/wifi_hotspot_plan.shtml?id16=unlimited_wifi_hotspot_plan >.

almost 15,000 hot spot locations in the United States as well.⁶⁶⁵

255. To augment their wide-area data service offerings, mobile telephone providers have typically offered WLAN services for high-speed, in-building data access.⁶⁶⁶ Certain providers – including T-Mobile, Sprint Nextel, and AT&T – offer at least one dual-mode handset that operates on both cellular and Wi-Fi networks. For example, T-Mobile’s Dash™ and Wing™ devices can connect to the company’s GPRS/EDGE network and are also Wi-Fi-enabled for high-speed data access.⁶⁶⁷ Sprint Nextel’s Mogul™ device, introduced in June 2007, offers access to both Sprint Nextel’s EV-DO network and Wi-Fi access points.⁶⁶⁸

256. The iPhone launched by Apple and AT&T in June 2007 runs on AT&T’s EDGE network and can connect to any Wi-Fi hot spot for Internet access service. The iPhone can seamlessly switch from an EDGE to a Wi-Fi connection, and will automatically display a list of new Wi-Fi networks in range as the user moves to a new location.⁶⁶⁹ By allowing users to access the Internet and other data capabilities at significantly higher speeds in hot spot locations, the iPhone’s Wi-Fi capability partly compensates for the slower speeds of the EDGE network and the device’s lack of connection to AT&T’s higher-speed WCDMA/HSDPA wireless broadband network.⁶⁷⁰ In September 2007, AT&T also began offering the Wi-Fi-configured BlackBerry® 8820.⁶⁷¹ Like the iPhone, the device provides users with data access over AT&T’s EDGE and Wi-Fi networks, automatically defaulting to a Wi-Fi signal when available.⁶⁷² Though currently sold by AT&T with Wi-Fi data service only, the device is also capable of Wi-Fi voice functionality.⁶⁷³

257. In addition to using Wi-Fi as a means of data access, over the past year certain mobile operators have begun to use WLANs to augment their CMRS-based voice services with voice connections at Wi-Fi hot spots. For example, in June 2007, T-Mobile and Cincinnati Bell introduced new services – “HotSpot@Home” and “Home Run,” respectively – featuring dual-mode handsets that offer seamless voice connections on both Wi-Fi and the operators’ GSM cellular networks.⁶⁷⁴ Both services

⁶⁶⁵ AT&T, *iPhone and AT&T’s Wireless Data Network* (visited Nov. 14, 2007) http://www.att.com/Common/merger/files/pdf/iphone_att_network_fs.pdf >.

⁶⁶⁶ See *Tenth Report*, at 15983. Carriers offer a range of WLAN Internet access service plans, typically designed for use with laptop computers with Wi-Fi modems, including annual access, month-to-month access, daily access, and metered access. See *Ninth Report*, at 20687.

⁶⁶⁷ T-Mobile, *T-Mobile Dash™* (visited Nov. 14, 2007) <<http://www.t-mobile.com>>; T-Mobile, *T-Mobile Wing™* (visited Nov. 14, 2007) <<http://www.t-mobile.com>>.

⁶⁶⁸ *Sprint Customers Will Get More Done With The New Mogul™ By HTC*, News Release, Sprint Nextel, June 18, 2007.

⁶⁶⁹ Walter S. Mossberg and Katherine Boehret, *Testing Out the iPhone*, WALL STREET JOURNAL, Jun. 27, 2007, at D1.

⁶⁷⁰ *Id.*

⁶⁷¹ Liane Cassavoy, *RIM Blackberry 8820; The First BlackBerry with Wi-Fi Support Debuts*, PC WORLD (visited Nov. 14, 2007) <<http://www.pcworld.com/article/id,137357-c,pdcellphonehybrids/article.html>>.

⁶⁷² *Id.*

⁶⁷³ *Id.*; RIM *Announces the BlackBerry 8820 Smartphone*, News Release, Research in Motion, Jul. 17, 2007.

⁶⁷⁴ *T-Mobile Introduces Unlimited Calling Over Wi-Fi With HotSpot@Home; CB Home Run Integrates Mobile Phone and Wireless Internet For Improved Indoor Reception*, News Release, Cincinnati Bell, June 18, 2007 (“*CB Home Run Integrates Mobile Phone and Wireless Internet*”). Subscribers to both services must also be enrolled in monthly plans of \$39.99 or above. See T-Mobile, *T-Mobile HotSpot@Home, The Only Phone You Need* (visited (continued....))

provide subscribers with improved, in-building coverage, as well as unlimited calling through a specified home or office Wi-Fi router and at all carrier-branded hot spot locations.⁶⁷⁵ With this feature, customers can avoid using the GSM voice minutes included in their monthly service plans when making voice-over-Wi-Fi calls while at home or in certain hot spot locations.⁶⁷⁶ Unlicensed Mobile Access (UMA) technology enables the seamless mobility afforded by these services, in which calls are automatically switched or handed off from a Wi-Fi to a cellular network, or vice versa, without interruption as a subscriber moves from one location to another.⁶⁷⁷

258. In September 2007, Sprint Nextel launched a service similar to T-Mobile's @Home service, called Airave, which allows subscribers to make unlimited wireless calls from their homes without deducting minutes from their monthly service plans.⁶⁷⁸ However, instead of connecting calls through a home Wi-Fi router, Airave relies on a femtocell device.⁶⁷⁹ A femtocell is a miniature base station that transmits in the licensed spectrum of the wireless operator offering the device and provides improved coverage within a subscriber's home. It uses the subscriber's home broadband connection for backhaul. As of October 2007, Sprint Nextel's Airave service was available in Indianapolis and Denver.⁶⁸⁰

VIII. MOBILE SATELLITE SERVICES

A. Introduction

259. As previously noted, any mobile satellite service that involves the provision of CMRS directly to end users is by statutory definition CMRS.⁶⁸¹ Therefore the Commission has included MSS in its analysis of competitive market conditions with respect to CMRS since the *First Report*.⁶⁸² Similar to the discussion of the terrestrial CMRS market, this section discusses spectrum bands available for MSS,

(Continued from previous page) _____

Nov. 14, 2007) <<http://www.t-mobile.com>>; Cincinnati Bell, *How Do I Get It? 3 Easy Steps to Outstanding Reception & Unlimited Calls* (visited Nov. 14, 2007) <<http://www.cincinnati-bell.com>>.

⁶⁷⁵ *T-Mobile Introduces Unlimited Calling Over Wi-Fi With HotSpot@Home; CB Home Run Integrates Mobile Phone and Wireless Internet*; Jessica E. Vascellaro and Amol Sharma, *Cell Phones Get W-Fi, Adding Network Options*, WALL STREET JOURNAL, June 27, 2007, at B1. Certain Home Run subscribers must use Cincinnati Bell's ZoomTown high-speed Internet service to receive full plan benefits. Cincinnati Bell, *Why CB Home Run? Outstanding Coverage and Unlimited Wireless Minutes are FREE with any D-Zone rate plan, Terms and Conditions* (visited Nov. 14, 2007) <http://www.cincinnati-bell.com/consumer/wireless/home_run/>. Subscribers may also be able to use voice-over-Wi-Fi services at public hot spots offering free Wi-Fi access.

⁶⁷⁶ Roger Cheng, *Apple's iPhone is Boosting the Buzz For Wi-Fi Networks, Too*, WALL STREET JOURNAL, Jul. 12, 2007, at B3.

⁶⁷⁷ *T-Mobile Introduces Unlimited Calling Over Wi-Fi With HotSpot@Home; CB Home Run Integrates Mobile Phone and Wireless Internet*; Glenn Fleishman, *T-Mobile Might Make Home VoIP Play on Top of Converged Calling*, WI-FI NET NEWS, Aug. 10, 2007.

⁶⁷⁸ *Sprint Customers in Select Areas of Denver and Indianapolis Get AIRAVE for Enhanced In-Home Coverage and Unlimited Calling*, News Release, Sprint, Sept. 17, 2007. The Airave includes voice, not data, services. Sprint Buzz About Wireless, *Sprint Airave FAQ* (visited Nov. 14, 2007) <<http://www.buzzaboutwireless.com/cms/hardware/sprint-airave-faq.html>>.

⁶⁷⁹ *Id.*

⁶⁸⁰ *Id.*

⁶⁸¹ See Section III.A, Services and Product Market Definition, *supra*.

⁶⁸² See *First Report*. See, also, Annual Report and Analysis of Competitive Market Conditions with Respect to Domestic and International Satellite Communication Services, *First Report*, 22 FCC Rcd 5954 (2007).

product and geographic markets, market structure, provider conduct, and performance.

B. Spectrum Bands Potentially Available for MSS

260. To date the Commission has approved satellite systems for operation in four MSS spectrum bands. The bands include the L-Band, Big LEO,⁶⁸³ Little LEO, and 2 GHz bands. Voice and data services are permitted in the L-band, Big LEO and 2 GHz bands. The Little LEO band is limited to non-voice services only (and is not depicted in the band plans below).

Table 17: Spectrum Bands Potentially Available for MSS

Spectrum Band	Megahertz
L-Band	68.0
Big LEO	45.7
Little LEO	4.0
2 GHz	40.0
Total	157.7

261. *L-band* – In the United States, the Commission has allocated spectrum for MSS downlinks in the 1525-1559 MHz bands and for MSS uplinks in the 1626.5-1660.5 MHz bands.⁶⁸⁴ This MSS spectrum, first used by the Inmarsat system, is often referred to as L-Band.⁶⁸⁵ This band was the first used for extensive commercial MSS offerings, first for maritime mobile uses, including safety communications, and later for aeronautical mobile and land mobile satellite services.

262. *Big LEO* – The Big LEO band refers to the 1.6/2.4 GHz bands. The Big LEO band MSS allocation consists of an uplink at 1610-1626.5 MHz and downlinks at 1613.8-1626.5 and 2483.5-2500 MHz. The Commission allocated this spectrum in 1993 to permit two-way voice and data communications anywhere in the world.

263. *Little LEO* – The Little LEO bands are located below 1 GHz. The Little LEO band MSS allocation consists of an uplink at 148-150 MHz and downlinks at 137-138 and 400-401 MHz. This spectrum was allocated by the Commission in 1993. Little LEO services include a variety of non-voice, data communications services, including, but not limited to, remote meter reading, vehicle tracking and two-way data messaging services to customers anywhere in the world.⁶⁸⁶

264. *2 GHz* – The 2 GHz MSS band allocation consists of an uplink at 2000-2020 MHz and a downlink at 2180-2200 MHz. The Commission allocated this spectrum in 1997 for the provision of new and expanded regional and global data, voice, and messaging MSS.⁶⁸⁷

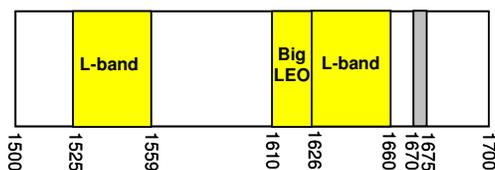
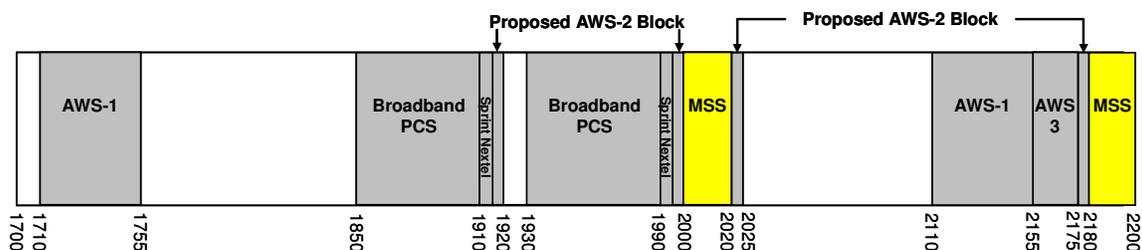
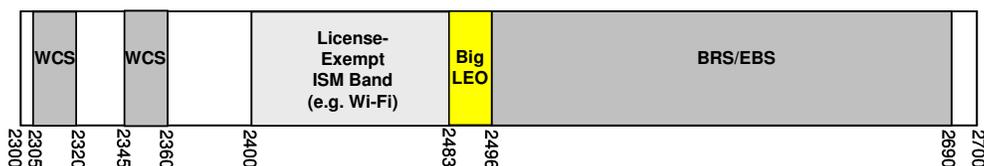
⁶⁸³ LEO refers to “Low-Earth Orbit.”

⁶⁸⁴ See 47 C.F.R. § 2.106.

⁶⁸⁵ The term “L-Band” refers generally and more broadly to the frequency band between 1 and 2 GHz.

⁶⁸⁶ *In re* Amendment of the Commission's Rules to Establish Rules and Policies Pertaining to a Non-Voice, Non-Geostationary Mobile-Satellite Service, *Report and Order* 8 FCC Rcd 8450 (1993).

⁶⁸⁷ Amendment of Section 2.106 of the Commission's Rules to Allocate Spectrum at 2 GHz for Use by the Mobile-Satellite Service, 12 FCC Rcd 7388 (1997).

1500-1700 MHz: MSS Spectrum**1700-2200 MHz: MSS Spectrum****2300-2700 MHz: MSS Spectrum****C. Product and Geographic Markets****1. Product Market**

265. Mobile satellite services range from voice-based applications, fax, and paging to highly customized data services for tailored enterprise applications. Retail MSS for individual consumers include offerings such as voice and Internet access for travelers seeking remote connectivity. Wholesale services include both voice and data applications. These services are often customized for specific customer groups.

266. In the past, the Commission has recognized the importance of satellite services in the provision of mobile communications services to remote areas stating “[W]e believe satellites are an excellent technology for delivering basic and advanced telecommunications services to unserved, rural, insular or economically isolated areas[.]”⁶⁸⁸ The Commission also recognized that terrestrial and satellite MSS are not fully interchangeable and serve separate markets. As stated earlier in this report, for MSS voice services, the Commission noted in its *Satellite Flexibility Order* that, since terrestrial CMRS and MSS are expected to have different prices, coverage, product acceptance and distribution, the two services appear, at best, to be imperfect substitutes for one another that would be operating in predominately different market segments.⁶⁸⁹ In a different proceeding, the Commission observed that

⁶⁸⁸ [check cite] See Establishment of Policies and Service Rules for the Mobile Satellite Service in the 2 GHz Band, Report and Order, 15 FCC Rcd 16127, ¶ 35 (2000).

⁶⁸⁹ *Satellite Flexibility Order*, at 1984.

MSS data services are not substitutes for other terrestrially-delivered mobile data services.⁶⁹⁰ SIA, in its comments filed in this proceeding, concurred with this stating "... although MSS providers continue to adopt innovative technologies to make their equipment more user friendly and cost effective, the current MSS services and products nevertheless remain harder to use and more expensive than the products offered by terrestrial CMRS operators. For these reasons, the current service offerings of MSS providers typically focus on a different market segment than terrestrial mobile services."⁶⁹¹

2. Geographic Market

267. The Commission considers that MSS is provided on a nationwide basis.⁶⁹² This implies that United States consumers face the choice of the same competitive alternatives with respect to MSS, and therefore that the relevant geographic market is nationwide.

D. MARKET STRUCTURE

1. Number of Carriers

268. As of year-end 2006, there were five MSS systems operating in the United States. There are two MSS systems that provide service in the United States using L-Band spectrum. They are the Mobile Satellite Ventures ("MSV") and Inmarsat⁶⁹³ systems. Two other systems, Globalstar and Iridium, provide mobile voice and data services using Big LEO spectrum. Lastly, the Orbcomm system provides non-voice data services, such as tracking, monitoring, and two-way messaging, using Little LEO spectrum.

269. Two additional systems using 2 GHz spectrum, the ICO Global Communications ("ICO") and TerreStar Networks ("TerreStar") systems, are under development. Both systems await the launch of their respective geostationary spacecraft to begin commercial service.

2. Privatization, Consolidation and Exit

270. Today's MSS market reflects a number of significant changes in organizational structure that occurred over the past eight years. One significant change involved the privatization of the commercial satellite operations of the International Maritime Satellite Organization, an intergovernmental treaty-based organization created in 1978. The commercial satellite assets of that organization were transferred to a private company in 1999. In addition, several MSS companies reorganized out of bankruptcy in the early 2000s. They include: ICO (2000); Iridium (2002); Orbcomm (2002); and Globalstar (2004). Lastly, the MSV system has evolved through a series of transactions in which MSV and its predecessor in interest, Motient Services Inc. ("Motient") joined with Canadian satellite company, TMI Communications and Company LP ("TMI"), to combine certain aspects of their respective U.S. and Canadian operations. TerreStar is a product of this series of transactions, and as a result of recent transactions, MSV and TerreStar are now owned by substantially different investor groups.

E. PROVIDER CONDUCT

1. Mobile Satellite Services and Customers

271. The following is a brief description of the services offered by facilities-based MSS

⁶⁹⁰ Prior to introduction of commercial Little LEO service, the Commission noted that such services are "expected to be more oriented towards non-voice communications for businesses and government entities." *See First Report*, at 8858.

⁶⁹¹ *See* SIA Comments at 4-5.

⁶⁹² *See First Report*, at 8866.

⁶⁹³ Based in the United Kingdom.

providers in the United States. The descriptions include both satellite CMRS and non-CMRS offerings.

272. *Inmarsat* – Inmarsat acts as wholesaler of satellite airtime, with services sold through partner vendors in over 80 countries worldwide.⁶⁹⁴ This past year Inmarsat introduced its BGAN (Broadband Global Area Network) service that offers mobile broadband connectivity via small terminals to both maritime and terrestrial-based customers.⁶⁹⁵ The service is marketed through Inmarsat’s reseller network. Inmarsat resellers also offer LandPhone, satellite-based connectivity for fixed phones for private or business applications or as a payphone for remote communities.⁶⁹⁶ For the maritime community, Inmarsat services include voice telephony, such as crew-calling and payphone applications, Internet, and data services, such as position reporting, weather and navigational chart updates.⁶⁹⁷ For the aeronautical sector, Inmarsat resellers offer specialized services, such as in-flight voice and data communications. In addition, in July 2007 Inmarsat introduced a dual-mode satellite-GSM handheld phone for the Asia, Africa, and Middle Eastern markets.⁶⁹⁸

273. *MSV* – MSV uses geostationary satellites in the L-band for voice and fax applications, including PTT,⁶⁹⁹ as well as low-speed mobile data services to customers in the United States and Canada.⁷⁰⁰ MSV services are sold through a retail sales channel that includes a direct sales force, dealers and resellers throughout the United States and Canada. Their customers include federal, state and local government agencies involved in public safety, homeland security and emergency response, as well as United States military and Coast Guard.⁷⁰¹ In addition, MSV sells bulk satellite capacity on a wholesale basis for specialized networks, such as fleet management and asset tracking services.⁷⁰²

274. *Globalstar* – The Globalstar Big LEO system offers mobile and fixed two-way voice and data services using CDMA handsets in over 120 countries worldwide. Globalstar’s voice telephony products include both portable handsets and fixed satellite antennas. The company offers data services including Internet and private data network connectivity, SMS, and asset tracking and monitoring applications. Globalstar sells its products and services directly through its own sales force, on-line, and through subsidiaries.

275. *Iridium* – The Iridium Big LEO system offers global coverage, including to polar regions, for commercial and enterprise two-way voice and data communications. Iridium’s services and products are sold through authorized service providers, resellers, manufacturers and developers.⁷⁰³ Terrestrial-

⁶⁹⁴ Inmarsat PLC, SEC Form 10-K, filed May 14, 2007 (“*Inmarsat 2006 10-K*”).

⁶⁹⁵ Inmarsat describes the BGAN service, which is available in over 175 countries, as simultaneous voice and data using a single portable terminal. Initial marketing has been largely aimed at land-based customers due to the nature of the spot-beam technology used on the current I-4 satellites. *BGAN Proves a Global Success as Fastest-Growing Service*, News Release, Inmarsat PLC, June 7, 2007.

⁶⁹⁶ Inmarsat PLC, *LandPhone* (visited July 30, 2007) < www.inmarsat.com >.

⁶⁹⁷ Inmarsat PLC, *Maritime Services* (visited July 30, 2007) < <http://www.inmarsat.com> >.

⁶⁹⁸ *16 July Date Set for Launch of New Satellite Phone Services*, News Release, Inmarsat PLC, June 22, 2007.

⁶⁹⁹ Push-To Talk (“PTT”) is a two-way radio service that allows voice communications among users in a customer-defined group.

⁷⁰⁰ See Mobile Satellite Ventures LP, Report to Noteholders Pursuant to Section 4.02(b)(2) of Indenture, 2007, at 38 (“*MSV Report to Noteholders*”).

⁷⁰¹ See Mobile Satellite Ventures, *MSV Company Fact Sheet* (visited July 30, 2007) < www.msvlp.com >.

⁷⁰² *MSV Report to Noteholders*, at 38.

⁷⁰³ Iridium Satellite LLC, *Where to Buy* (visited July 30, 2007) < www.iridium.com >.

based Iridium services include a prepaid land-mobile telephony service, paging and other data or machine-to-machine (“M2M”) services, such as asset tracking.⁷⁰⁴ Additionally, Iridium offers a variety of maritime services including crew calling, a networked ship-to-ship calling service called “InNetwork”, maritime data services such as vessel monitoring and tracking, ship safety and alert systems and fax.⁷⁰⁵ For the aviation sector, Iridium offers cockpit flight communications, tracking and monitoring services.⁷⁰⁶

276. *Orbcomm* – Orbcomm’s Little LEO system offers narrowband two-way M2M data communications services in 75 countries, including digital messaging, data communications, and geo-positioning and weather services that are not interconnected with the PSTN.⁷⁰⁷ Orbcomm offers the following services: monitoring and asset control; fleet tracking and management; and, messaging and remote data for various customer groups, including transportation (trucks, trailers, railcars, containers, heavy equipment), natural resources (fluid tanks, utility meters, pipelines, and oil wells), and marine vessels.⁷⁰⁸ Orbcomm’s hardware, software and airtime are sold directly to equipment manufacturers and government customers and through value-added resellers and representatives.

F. Pricing

277. Pricing for MSS varies considerably among MSS providers and resellers, and the services are often bundled with MSS equipment purchases. Similar to terrestrial CMRS services, retail consumers of satellite CMRS services typically purchase a handset bundled with a service plan. While prices for satellite phone handsets have fallen, they still exceed most terrestrial CMRS equipment. The prices for MSS handsets range between \$500 and \$4,000 or more. MSS retail service plans vary greatly and typically include monthly or annual plans with a specific number of minutes per month or year, additional minutes starting at \$0.99 per minute, and additional roaming charges.

278. In 2007, Globalstar introduced a new pricing structure when it launched a promotional satellite airtime rate plan for both new and existing customers in the United States. The “Unlimited Loyalty” rate plan includes a \$49.99 per month charge for Globalstar satellite network access and unlimited home minutes for calls to the United States, Canada and the Caribbean. The advertised monthly fee will be reduced at the completion of each calendar year, falling to \$39.99 per month in 2008 and \$19.99 per month in 2009 and 2010.⁷⁰⁹ In other pricing plans, Globalstar offers “bundled minutes” for heavy use customers and annual prepaid, fixed-price plans for a certain number of minutes to be used at any time within the year, and permits the rollover of unused minutes into the following year. Additionally, Globalstar’s Emergency Plan offers an annual system access fee with per-minute fees based on usage.⁷¹⁰

279. In April 2007, Iridium also introduced a new pricing plan for calls originating in or coming to United States, Canadian and Caribbean customers. Under the new structure, Iridium will offer prepaid airtime packages for six months of service for as low as 30 to 40 cents per minute. Additional

⁷⁰⁴ *Iridium® Plays Key Role in Recovering Stolen Vehicles Using GEOTrac's Asset Tracking and Mapping Technology*, News Release, Iridium Satellite LLC, June 19, 2007.

⁷⁰⁵ Iridium Satellite LLC, *Solutions* (visited July 30, 2007) <www.iridium.com>.

⁷⁰⁶ Iridium Satellite LLC, *Solutions* (visited July 30, 2007) <www.iridium.com>.

⁷⁰⁷ ORBCOMM, *Who We Are* (visited July 30, 2007) <www.orbcomm.com>.

⁷⁰⁸ ORBCOMM, *Solutions Showcase* (visited July 30, 2007) <www.orbcomm.com>.

⁷⁰⁹ *Unlimited Globalstar Satellite Airtime for Under \$50 per Month*, News Release, Globalstar, Apr. 10, 2007.

⁷¹⁰ *Globalstar 2006 10-K*, at 7.

discounted packages for higher use customers begin at rates below 15 cents per minute.⁷¹¹ Iridium also offers a network quality guarantee program, providing credits of up to 100 minutes of airtime and three months of free subscription fees if the Iridium network fails to complete properly initiated voice calls. Iridium's service plans are often bundled with equipment sales. One user estimated a 96-handset system would cost between \$300,000 - \$400,000.⁷¹²

280. Examples of other MSS voice pricing plans being offered to retail consumers include MSV's mobile telephony and PTT services. MSV's mobile telephony prices average approximately \$1.00 per minute for monthly contracts while the PTT plans offer unlimited dispatch calling within the PTT access group with additional charges of \$1.19 per minute for mobile telephony charges. Lastly, Inmarsat currently offers MSS voice service using its recently introduced BGAN service at \$0.99 per minute.

G. Technology Deployment and Upgrades

1. Ancillary Terrestrial Component

281. In 2003, the Commission released a Report and Order that permitted MSS licensees to provide ATC to their satellite systems.⁷¹³ In future MSS systems with ATC, a terrestrial base station may be sited within the much larger footprint of a satellite beam to extend communications to indoor or urban areas where the satellite signal may be blocked by buildings and other infrastructure. The Commission permits MSS providers in the 2 GHz, Big LEO, and L-Band frequency bands to implement ATC, provided that the MSS licensee: (1) has launched and operates its own satellite facilities; (2) provides substantial satellite service to the public; (3) provides integrated ATC; (4) observes existing satellite geographic coverage requirements; and (5) limits ATC operations only to the authorized satellite footprint.⁷¹⁴ The Commission has granted ATC authorizations to MSV for its operations in the L-Band⁷¹⁵ and to Globalstar for its operations in the Big LEO band.⁷¹⁶

282. The satellite industry is optimistic about the potential positive effects of the ATC Order. Comments filed jointly by five satellite companies stated:

[O]nce deployed, MSS/ATC systems will be poised to bring to the marketplace the high-quality, affordable mobile services for their current and future public safety and commercial customers – no matter where they are located- that the Commission envisioned when it decided to permit MSS providers to incorporate ATC into their MSS systems. Furthermore, because MSS/ATC providers will offer user equipment that resembles traditional mobile consumer devices, they will be able to take better advantage of economies of scale for equipment, making it possible for them to offer high quality voice, broadband, and other services to their subscribers at prices that more

⁷¹¹ *Iridium Satellite Announces New North American Pricing Plan*, News Release, Iridium Satellite, LLC, Apr. 25, 2007.

⁷¹² Chris Kirkham, *Satellite Phone Firm Focuses on Crisis Network*, WASHINGTON POST, June 26, 2006, at D1.

⁷¹³ See Flexibility for Delivery of Communications by Mobile Satellite Service Providers in the 2 GHz Band, the L-Band, and the 1.6/2.4 GHz bands; Review of the Spectrum Sharing Plan Among Non-Geostationary Satellite Orbit Mobile Satellite Service Systems in the 1.6/2.4 GHz Bands, 18 F.C.C.R. 1962 (2003) ("*Satellite Flexibility Order*"), *modified sua sponte*, 18 F.C.C.R. 13590 (2003), *rev'd*, 20 FCC Rcd 4616 (2005), *appeal docketed*.

⁷¹⁴ See *Satellite Flexibility Order*, at 1964.

⁷¹⁵ Mobile Satellite Ventures Subsidiary LLC Application for Minor Modification of Space Station License for AMSC-1, *Order and Authorization*, 19 FCC Rcd 22144 (2004).

⁷¹⁶ Globalstar LLC Request for Authority to Implement an Ancillary Terrestrial Component for the Globalstar Big LEO Mobile Satellite Service (MSS) System, *Order and Authorization*, 21 FCC Rcd 398 (2006).

closely approximate those of cellular and PCS operators. Moreover, some MSS/ATC operators will be able to offer smaller, less expensive handsets comparable to those offered by terrestrial providers.⁷¹⁷

2. Satellite System Deployment Plans

283. The two 2 GHz MSS licensees, ICO and TerreStar, are scheduled to launch new spacecraft in the near future and several current MSS satellite operators have announced plans to replace or augment their existing constellations.

284. *ICO* – ICO plans to launch a Space Systems Loral-built geostationary spacecraft, ICO G1, in early 2008. In February 2007, the Commission approved an extension of ICO's milestone deadline to delay the spacecraft's launch from July 2007 to November 2007.⁷¹⁸ A request for a brief additional extension, due to launch scheduling issues, is pending.⁷¹⁹ The company has invested over \$310 million in construction and launch of the spacecraft, along with an option to purchase one spare by December 2008.⁷²⁰ ICO plans to utilize its new spacecraft for ATC-based business opportunities, including satellite-terrestrial cellular and broadband applications and an integrated mobile video, interactivity and navigation.⁷²¹ ICO has also signed an agreement with Space Systems Loral to design additional MEO⁷²² spacecraft.⁷²³

285. *TerreStar* – TerreStar plans to construct two Space Systems Loral-built geostationary spacecraft - TerreStar-I, scheduled for launch in 2008, and TerreStar-II, a ground spare. In September 2007, the Commission granted TerreStar's request to extend its launch milestone from November 2007 to September 2008, so that TerreStar could address certain production problems that had arisen during construction of TerreStar-I.⁷²⁴ TerreStar invested an estimated \$500 million in the satellite network, which it intends to utilize for a 4G integrated mobile satellite and terrestrial communications network for customer-designed products and applications in the United States, Canada and Puerto Rico.⁷²⁵

286. *MSV* – MSV plans to launch two Boeing-built second generation geostationary satellites in 2009, with an option to order a third spacecraft.⁷²⁶ The satellites will have ten times the capacity of MSV's existing fleet and will be optimized for mobile broadband services. MSV envisions offering its new satellite infrastructure as a "carrier's carrier" wholesale model to strategic partners and other

⁷¹⁷ See, MSS Providers Comments, at 9-10 (filed May 7, 2007).

⁷¹⁸ *In re New ICO Satellite Services G.P.*, 22 F.C.C.R. 2229 (2007).

⁷¹⁹ See, File No. SAT-MOD-20070806-00110. See also, 47 C.F.R. 25.161(a)(2)(staying automatic termination of an authorization where "a request for an extension of time has been filed with the Commission but has not been acted on").

⁷²⁰ *FCC Grants Milestone Extension To ICO*, News Release, ICO Global Holdings, Inc., Feb. 5, 2007.

⁷²¹ ICO Global Holdings, Inc., *ICO Presentation at Cowen and Company 35th Annual Technology Conference 2007 Focus on SMidCap*, 2007, at 14.

⁷²² MEO refers to "Medium-Earth Orbit."

⁷²³ *ICO Signs Design/Option Agreement with Space Systems/Loral for MEO Satellites*, News Release, ICO Global Holdings, July 3, 2007.

⁷²⁴ TerreStar Networks, Inc. Request for Milestone Extension, *Memorandum Opinion and Order*, 22 FCC Rcd 17698 (2007).

⁷²⁵ TerreStar Networks, Inc., *Investor Presentation*, Dec. 7, 2007, at 18 ("*TerreStar Investor Presentation*").

⁷²⁶ *In re Mobile Satellite Ventures Subsidiary LLC*, 20 F.C.C.R. 9752 (2005).

wholesale customers for differentiated broadband services.⁷²⁷

287. *Globalstar* – Globalstar has invested an estimated \$120 million to launch eight satellites, four of which were launched in May 2007, to augment its existing constellation of LEO satellites.⁷²⁸ Additionally, the company contracted with Alcatel Alenia (France) to build a next-generation LEO network of 48 spacecraft for an estimated \$868 million.⁷²⁹

288. *Iridium* – In February 2007, Iridium announced plans to contract for a network to replace its existing constellation within the next two years.⁷³⁰ The company estimates it will spend \$2 billion to construct and deploy the new network, which would launch as early as 2013 and may include enhanced capabilities such as imaging.⁷³¹

H. MARKET PERFORMANCE

1. Subscribers

289. Based on a 2007 study prepared by Futron Corporation (the “SIA/Futron study”), SIA estimates that the world mobile satellite services industry had 1.5 million end-user terminals.⁷³² MSS providers active in the United States market consisted of just under 1.1 million terminals, based on year-end 2006 company reports.⁷³³ The industry added approximately 232,000 terminals over the previous year, or a 27 percent increase in terminals in 2006.

⁷²⁷ *MSV Note to Shareholders*, at 38.

⁷²⁸ *Globalstar Announces Successful Launch of Four Satellites*, News Release, Globalstar, Inc., May 30, 2007.

⁷²⁹ *Globalstar, Inc. Signs Contract with Alcatel Alenia Space for Second-Generation LEO Satellite Constellation*, News Release, Globalstar, Inc., Dec. 4, 2006.

⁷³⁰ *Iridium® NEXT' to be Unveiled at SATELLITE 2007*, News Release, Iridium Satellite LLC, Feb. 15, 2007.

⁷³¹ Andy Pasztor, *Iridium Weighs Upgrade of Satellites*, WALL STREET JOURNAL, Feb. 17, 2007, at 1.

⁷³² Satellite Industry Association and Futron Corporation, *State of the Satellite Industry Report*, 2007, at 21 (“SIA Futron Report”). The SIA Futron Report does not include mobile services in the FSS frequency range in these statistics. *Id.*

⁷³³ Due to the inherently global nature of many of the mobile satellite networks, many companies do not disaggregate United States subscriber terminal numbers from worldwide subscriber terminal data.

**Table 18: Number Of Terminals
For Major United States Mobile Satellite Service Providers**

	Year-End 2005 Terminals	Year-End 2006 Terminals
Inmarsat ⁷³⁴	199,500	220,300
Globalstar ⁷³⁵	196,000	262,800
MSV ⁷³⁶	200,000	200,000
Iridium ⁷³⁷	142,000	175,000
Orbcomm ⁷³⁸	113,000	225,000
TOTAL	850,500	1,083,100

IX. CONCLUSION

290. U.S. consumers continue to benefit from effective competition in the CMRS marketplace. During 2006, the CMRS industry experienced another year of strong growth, demonstrating the continuing demand for and reliance upon mobile services. As of December 2006, we estimate there were approximately 241.8 million mobile telephone subscribers, which translates into a nationwide penetration rate of roughly 80 percent.⁷³⁹ Consumers continue to increase their use of mobile telephones for both voice and data services. Partly because of the prevalence of mobile service packages with large buckets of inexpensive minutes, the average amount of time U.S. mobile subscribers spend talking on their mobile phones rose to 714 minutes per month in the second half of 2006, an increase of six minutes from a year earlier and more than quadruple the average usage of mobile subscribers in Western Europe and Japan.⁷⁴⁰ Survey evidence also indicates that U.S. mobile subscribers have experienced an improvement in call quality in the past year. Moreover, although U.S. mobile subscribers still prefer to use their mobile phones to talk rather than to send text messages, they sent 158 billion text messages and 2.7 billion photo messages or other types of multimedia messages in 2006, nearly double the volume of text messages and more than double the volume of multimedia messages in the same period of 2005.⁷⁴¹ Relatively low prices on mobile voice and data services appear to have been a key factor stimulating subscriber growth and usage. While the average price of a mobile call as measured by an estimate of average revenue per-minute in December 2006 was unchanged from the previous year,⁷⁴² mobile telephone service in the United States remains relatively inexpensive on a per minute basis compared with that in Western Europe

⁷³⁴ Inmarsat PLC, SEC Form 10-K, filed Mar. 9, 2006 (“*Inmarsat 2005 10-K*”).

⁷³⁵ *Globalstar 2006 10-K*, at 41.

⁷³⁶ *MSV Report to Noteholders*, at 3; SkyTerra, Report of Unscheduled Material Events or Corporate Changes, at 48 (“*SkyTerra 8-K*”).

⁷³⁷ *Iridium Announces Q4 and Full-Year 2006 Results*, News Release, Iridium Satellite LLC, Feb. 14, 2007. (“*Iridium 2006 Results*”).

⁷³⁸ *Orbcomm Nearly Doubles Subscriber Communicators in 2006*, News Release, ORBCOMM, Jan. 04, 2007.

⁷³⁹ See Section VI.B.1, Subscriber Growth, *supra*.

⁷⁴⁰ See Section VI.B.2, Minutes of Use, *supra*, and VI.D, International Comparisons, *supra*.

⁷⁴¹ See Section VI.B.1, Subscriber Growth, *supra*, and Section VI.B.3, Mobile Data Usage, *supra*.

⁷⁴² See Section VI.A.1, Pricing Trends, *supra*.

and Japan.⁷⁴³

291. In addition to the indicators of mobile market performance cited in the preceding paragraph, a wide variety of indicators of provider conduct and market structure also show that competition in mobile telecommunications markets is flourishing. For example, mobile telephone providers continued to build out their networks and expand service availability during 2006.⁷⁴⁴ Providers also continued to deploy networks based on CDMA2000 EV-DO or WCDMA/HSDPA technologies that allow them to offer mobile Internet access services for mobile telephone handsets, PDAs, and laptops at speeds comparable to what many users get from fixed broadband connections such as DSL. With respect to market structure, there was a sixteen percent increase in the percentage of the U.S. population living in counties with access to five or more different mobile telephone operators, from nearly 51 percent at the end of 2005 to 59 percent at the end of 2006. Moreover, 98 percent of the total U.S. population continues to live in counties where three or more different operators compete to offer mobile telephone service in some parts of those counties, while nearly 94 percent of the U.S. population continues to live in counties with four or more mobile telephone operators competing to offer service.⁷⁴⁵ In addition, approximately 95 percent of the U.S. population lives in census blocks with at least three mobile telephone operators competing to offer service, and approximately 57 percent of the population lives in census blocks with at least five competing operators.

292. In addition, a growing number of wireless customers have “cut the cord” in the sense of canceling their subscription to wireline telephone service. According to one 2006 survey, 11.8 percent of adults, or one out of every 8, lived in households with only wireless phones in the second half of 2006, up from 7.8 percent in the second half of 2005, and triple the percentage (3.5 percent) in the second half of 2003.

293. Using the various data sources and metrics discussed above, we have met our statutory requirement to analyze the competitive market conditions with respect to commercial mobile services,⁷⁴⁶ and conclude that the CMRS marketplace is effectively competitive.

X. PROCEDURAL MATTERS

294. This Eleventh Report is issued pursuant to authority contained in Section 332 ©(1)© of the Communications Act of 1934, as amended, 47 U.S.C. § 322 ©(1)©.

295. It is ORDERED that the Secretary shall send copies of this Report to the appropriate committees and subcommittees of the United States House of Representatives and the United States Senate.

⁷⁴³ See Section VI.D, International Comparisons, *supra*.

⁷⁴⁴ See Section Technology Deployment and Upgrades IV.B.1, Technology Deployment and Upgrades, *supra*.

⁷⁴⁵ See Table 1: Estimated Mobile Telephone Rollouts, *supra*.

⁷⁴⁶ See Section II.A, Background, *supra*.

296. It is FURTHER ORDERED that the proceeding in the WT Docket No. 07-71 IS TERMINATED.

FEDERAL COMMUNICATIONS COMMISSION

Marlene H. Dortch
Secretary

APPENDIX A

Mobile Telephony

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Table A - 1: CTIA's Semi-Annual Mobile Telephone Industry Survey

Date	Estimated Total Subscribers	Year End over Year End Subscriber Increase	12-Month Total Service Revenues (in \$000s)	12-Month Roamer Services Revenues (in \$000s)	Cell Sites	Direct Service Provider Employees	Average Local Monthly Bill (Dec. Survey Periods)
1985	340,213	248,613	\$482,428	N/A	913	2,727	N/A
1986	681,825	341,612	\$823,052	N/A	1,531	4,334	N/A
1987	1,230,855	549,030	\$1,151,519	N/A	2,305	7,147	\$96.83
1988	2,069,441	838,586	\$1,959,548	N/A	3,209	11,400	\$98.02
1989	3,508,944	1,439,503	\$3,340,595	\$294,567	4,169	15,927	\$83.94
1990	5,283,055	1,774,111	\$4,548,820	\$456,010	5,616	21,382	\$80.90
1991	7,557,148	2,274,093	\$5,708,522	\$703,651	7,847	26,327	\$72.74
1992	11,032,753	3,475,605	\$7,822,726	\$973,871	10,307	34,348	\$68.68
1993	16,009,461	4,976,708	\$10,892,175	\$1,361,613	12,805	39,775	\$61.48
1994	24,134,421	8,124,960	\$14,229,922	\$1,830,782	17,920	53,902	\$56.21
1995	33,785,661	9,651,240	\$19,081,239	\$2,542,570	22,663	68,165	\$51.00
1996	44,042,992	10,257,331	\$23,634,971	\$2,780,935	30,045	84,161	\$47.70
1997	55,312,293	11,269,301	\$27,485,633	\$2,974,205	51,600	109,387	\$42.78
1998	69,209,321	13,897,028	\$33,133,175	\$3,500,469	65,887	134,754	\$39.43
1999	86,047,003	16,837,682	\$40,018,489	\$4,085,417	81,698	155,817	\$41.24
2000	109,478,031	23,431,028	\$52,466,020	\$3,882,981	104,288	184,449	\$45.27
2001	128,374,512	18,896,481	\$65,316,235	\$3,752,826	127,540	203,580	\$47.37
2002	140,766,842	12,392,330	\$76,508,187	\$3,895,512	139,338	192,410	\$48.40
2003	158,721,981	17,955,139	\$87,624,093	\$3,766,267	162,986	205,629	\$49.91
2004	182,140,362	23,418,381	\$102,121,210	\$4,210,331	175,725	226,016	\$50.64
2005	207,896,198	25,755,836	\$113,538,221	\$3,786,331	183,689	233,067	\$49.98
2006	233,040,781	25,144,583	\$125,456,825	\$3,494,294	195,613	253,793	\$50.56

Source: CTIA, *Background on CTIA's Semi-Annual Wireless Industry Survey*

<http://files.ctia.org/pdf/CTIA_Survey_Year_End_2006_Graphics.pdf> (Annualized Wireless Industry Survey Results – December 1985 To December 2006: Reflecting Domestic U.S. Commercially-Operational Cellular, ESMR and PCS Providers).

**Table A - 2: FCC's Semi-Annual Local Telephone Competition Survey:
Mobile Telephone Subscribership**

State	Jun 2006		Subscribers								
	Carriers ¹	Percent Resold ²	2000	2001	2002	2003	2004		2005		2006
			Jun	Jun	Jun	Jun	Jun	Dec	Jun	Dec	Jun
Alabama	12	5 %	1,253,084	1,930,631	2,027,845	2,100,557	2,301,847	2,580,810	2,843,385	3,071,359	3,240,669
Alaska	10	1	169,892	218,424	242,133	*	307,323	321,152	340,507	376,695	397,429
American Samoa	*	*	0	0	0	0	*	*	*	*	*
Arizona	10	9	1,624,668	2,018,410	2,412,998	2,643,952	3,079,657	3,299,222	3,547,280	3,849,152	4,158,483
Arkansas	6	7	715,467	891,275	1,130,302	1,351,291	1,376,564	1,458,673	1,681,404	1,781,266	1,925,696
California	11	4	12,283,369	14,184,625	16,007,376	18,892,619	21,575,797	23,457,761	24,598,429	25,564,483	27,524,044
Colorado	9	10	1,654,989	1,983,405	2,247,166	2,426,929	2,727,910	2,808,195	3,053,186	3,260,286	3,442,153
Connecticut	5	6	1,136,618	1,418,367	1,577,873	1,791,944	2,064,204	2,181,133	2,332,045	2,466,372	2,585,425
Delaware	4	6	275,219	389,284	433,059	503,353	593,452	646,064	710,853	751,042	790,189
Dist. of Columbia	4	5	333,815	382,457	415,399	520,182	555,958	657,774	746,529	819,061	872,184
Florida	8	5	4,983,478	7,536,670	8,607,715	10,252,348	11,916,615	13,169,278	12,577,898	12,521,686	14,125,590
Georgia	10	6	2,687,238	4,076,119	4,300,831	4,709,288	5,332,517	5,730,223	6,023,302	6,103,234	6,891,999
Guam	*	0	*	*	*	*	*	*	*	61,670	66,767
Hawaii	4	3	454,364	543,283	640,247	732,262	819,262	880,965	935,189	983,998	1,011,076
Idaho	15	6	296,066	398,781	500,693	572,406	653,779	705,948	777,445	838,095	905,581
Illinois	9	6	4,309,660	5,621,044	5,409,370	6,834,217	7,529,966	8,075,938	8,575,211	9,026,588	9,540,120
Indiana	8	11	1,717,378	1,781,247	2,032,290	2,456,509	2,844,568	3,158,002	3,276,910	3,536,228	3,781,322
Iowa	46	10	975,629	861,382	1,157,580	1,250,505	1,445,711	1,557,542	1,593,673	1,767,830	1,820,681
Kansas	13	10	724,024	901,225	1,061,171	1,195,230	1,345,160	1,454,087	1,538,945	1,666,340	1,771,588
Kentucky	10	10	999,344	1,176,756	1,505,982	1,595,290	2,000,459	2,189,345	2,495,494	2,649,143	2,807,061
Louisiana	8	6	1,294,693	1,677,292	2,187,811	2,365,224	2,547,153	2,834,716	2,997,513	3,258,336	3,425,482
Maine	6	12	283,640	399,616	457,835	524,246	610,533	662,623	785,814	823,242	870,197
Maryland	6	6	2,013,058	2,446,818	2,684,441	3,108,086	3,575,747	3,900,172	4,177,782	4,470,611	4,719,558
Massachusetts	5	6	2,228,169	2,753,685	3,289,934	3,506,039	3,919,139	4,042,592	4,316,120	4,544,572	4,724,175
Michigan	11	7	3,423,535	4,071,091	4,758,538	4,889,269	5,430,637	5,766,616	6,238,846	6,613,341	6,872,249
Minnesota	9	10	1,595,560	2,014,317	2,254,895	2,564,783	2,823,079	2,973,126	3,124,214	3,370,196	3,532,420
Mississippi	9	7	509,038	993,781	1,106,700	1,232,750	1,411,277	1,517,702	1,627,762	1,817,099	1,919,199
Missouri	11	8	1,848,775	1,937,684	2,246,430	2,515,325	2,859,953	3,109,167	3,482,839	3,732,549	3,942,213
Montana	7	4	*	*	291,429	343,160	*	*	467,795	526,954	577,149
Nebraska	8	4	600,885	712,685	838,568	900,744	984,355	1,045,810	1,078,955	1,169,068	1,208,393
Nevada	8	7	825,163	766,581	895,586	1,077,380	1,319,684	1,463,370	1,605,708	1,778,411	1,884,304
New Hampshire	6	8	309,263	445,181	529,795	598,504	686,746	727,985	916,833	989,443	1,049,150
New Jersey	4	4	2,750,024	3,896,778	4,531,457	5,392,240	6,326,459	7,388,722	7,269,330	7,723,622	8,120,504
New Mexico	10	8	395,111	619,582	735,107	828,869	939,091	987,813	1,025,143	1,170,436	1,252,943
New York	10	7	5,016,524	6,749,096	7,915,526	8,829,070	9,939,759	10,834,741	11,901,311	12,634,420	13,338,040
North Carolina	14	6	2,730,178	3,377,331	4,610,120	4,305,521	4,875,916	5,363,630	5,496,422	5,784,334	6,200,866
North Dakota	6	3	*	*	*	*	*	*	388,609	454,456	481,655
Northern Mariana Isl.	*	*	*	*	*	*	*	*	*	*	*
Ohio	12	8	3,278,960	4,255,934	4,887,376	5,659,459	6,188,081	6,627,910	7,056,675	7,571,540	8,010,972
Oklahoma	15	8	979,513	1,200,234	1,366,475	1,574,588	1,724,505	1,760,122	2,000,787	2,187,424	2,315,999
Oregon	10	8	1,082,425	1,268,909	1,473,883	1,682,036	1,894,285	2,029,224	2,128,710	2,417,992	2,567,147
Pennsylvania	10	8	3,850,372	4,378,216	4,987,067	5,681,653	6,420,037	7,037,296	7,340,862	7,881,534	8,283,918
Puerto Rico	6	1	1,090,005	1,374,747	1,136,619	1,401,599	1,698,702	2,076,698	2,002,851	2,110,798	2,170,540
Rhode Island	4	8	313,550	401,805	463,636	527,366	615,398	607,489	653,900	709,525	726,483
South Carolina	12	6	1,236,338	1,502,345	1,830,516	2,041,541	2,337,367	2,369,252	2,593,000	2,768,481	2,984,417
South Dakota	6	3	*	*	292,210	344,825	382,906	428,513	435,063	482,623	515,139
Tennessee	12	7	1,876,444	2,251,208	2,660,068	2,800,735	3,171,487	3,531,286	3,791,154	4,114,401	4,401,813
Texas	30	7	6,705,423	8,294,338	9,650,715	10,776,234	12,091,134	13,092,007	14,402,814	15,620,248	16,902,077
Utah	9	6	692,006	833,492	970,854	1,094,563	1,229,029	1,345,205	1,415,896	1,531,763	1,651,606
Vermont	4	15	*	*	*	*	*	*	295,971	315,382	334,655
Virgin Islands	*	*	0	*	*	*	*	*	*	*	*
Virginia	8	6	2,447,687	3,059,420	3,429,450	3,879,582	4,392,319	4,240,462	4,900,018	5,126,216	5,382,292
Washington	10	9	2,144,767	2,493,214	2,849,043	3,102,750	3,567,896	3,770,602	3,995,325	4,177,196	4,418,314
West Virginia	10	14	347,916	452,036	549,722	579,983	713,657	761,658	821,103	858,599	964,977
Wisconsin	12	7	1,342,908	2,008,679	2,523,956	2,533,215	2,831,645	2,997,029	3,191,190	3,355,951	3,505,936
Wyoming	7	6	*	173,939	168,232	276,344	277,658	302,203	330,567	358,593	376,753
Nationwide	160	7 %	90,643,058	114,028,928	130,751,459	147,623,734	167,313,001	181,105,135	192,053,067	203,667,472	217,418,404

* Data withheld to maintain firm confidentiality. Some data for December 2005 have been revised.

¹ For data through December 2004, only facilities-based wireless carriers with at least 10,000 mobile telephony subscribers per state were required to report data, and they were instructed to use billing addresses to determine subscriber counts by state. Starting with the June 2005 data, all facilities-based wireless carriers are required to report, and to use the area codes of telephone numbers provided to subscribers to determine subscriber counts by state.

² Percentage of mobile wireless subscribers receiving their service from a mobile wireless reseller.

Table A - 3: Economic Area Penetration Rates

EA	EA Name	Subscribers	2006 Estimated EA Population	2006 Penetration Rate	2006 HHI	2005 HHI	EA density
83	New Orleans, LA-MS (see note)	1,465,846	1,464,287	100%	3011	3040	171.93
74	Huntsville, AL-TN	1,038,091	1,044,840	99%	2307	2579	119.14
57	Detroit-Ann Arbor-Flint, MI	6,713,437	7,028,688	96%	2926	2831	364.07
82	Biloxi-Gulfport-Pascagoula, MS	360,351	380,309	95%	2130	1896	143.45
161	San Diego, CA	2,759,801	2,941,454	94%	2725	2789	660.48
13	Washington-Baltimore, DC-MD-VA-WV-PA	8,385,571	9,116,583	92%	2739	2739	402.76
78	Birmingham, AL	1,496,436	1,635,579	91%	2631	2559	137.13
31	Miami-Fort Lauderdale, FL	5,529,633	6,152,906	90%	2279	2418	483.20
155	Farmington, NM-CO	190,426	214,501	89%	3495	3462	16.04
81	Pensacola, FL	591,559	672,548	88%	2077	2080	154.06
29	Jacksonville, FL-GA	1,844,718	2,097,573	88%	2317	2303	112.52
30	Orlando, FL	3,750,789	4,310,181	87%	2829	3028	265.84
40	Atlanta, GA-AL-NC	5,674,922	6,506,031	87%	2360	2360	246.04
34	Tampa-St. Petersburg-Clearwater, FL	2,311,064	2,697,731	86%	1863	2018	890.99
32	Fort Myers-Cape Coral, FL	762,781	885,993	86%	2189	2416	234.27
10	New York-No. New Jer.-Long Island, NY-NJ-CT-PA-MA-VT	22,544,981	26,461,221	85%	2651	2659	890.56
12	Philadelphia-Wilmington-Atl. City, PA-NJ-DE-MD	6,407,332	7,541,550	85%	2739	2749	778.84
26	Charleston-North Charleston, SC	546,628	642,645	85%	2035	2046	149.80
85	Lafayette, LA	531,936	625,725	85%	4338	4193	99.99
160	Los Angeles-Riverside-Orange County, CA-AZ	16,451,596	19,581,553	84%	2633	2662	286.10
172	Honolulu, HI	1,076,868	1,285,498	84%	2394	2504	187.20
20	Norfolk-Virginia Beach-Newport News, VA-NC	1,506,429	1,806,167	83%	2057	2036	289.89
23	Charlotte-Gastonia-Rock Hill, NC-SC	1,926,844	2,327,814	83%	2245	2219	240.50
170	Seattle-Tacoma-Bremerton, WA	3,693,238	4,459,748	83%	2585	2600	190.45
131	Houston-Galveston-Brazoria, TX	5,360,085	6,488,216	83%	2349	2510	169.25
28	Savannah, GA-SC	606,032	732,041	83%	1609	1605	91.95
80	Mobile, AL	584,360	705,723	83%	2727	3291	74.75
153	Las Vegas, NV-AZ-UT	1,829,855	2,202,694	83%	2515	2584	23.74
163	San Francisco-Oakland-San Jose, CA	7,827,858	9,489,783	82%	2585	2636	271.07
22	Fayetteville, NC	444,193	540,399	82%	1967	1971	164.57
130	Austin-San Marcos, TX	1,339,033	1,625,839	82%	2705	2920	156.06
84	Baton Rouge, LA-MS	652,819	800,225	82%	4531	4331	140.30
87	Beaumont-Port Arthur, TX	369,646	449,580	82%	3125	3151	89.20
79	Montgomery, AL	402,156	491,644	82%	1847	2196	66.86
3	Boston-Worcester-Lawrence-Lowell-Brockton, MA-NH-RI-VT	6,606,918	8,139,965	81%	2700	2664	421.83
33	Sarasota-Bradenton, FL	703,563	872,586	81%	2148	2377	273.56
42	Asheville, NC	387,421	476,796	81%	3690	3538	128.63
15	Richmond-Petersburg, VA	1,258,611	1,557,145	81%	2335	2250	124.03
25	Wilmington, NC-SC	793,821	980,777	81%	1903	1897	107.39
134	San Antonio, TX	1,974,327	2,425,081	81%	2793	3173	82.99
35	Tallahassee, FL-GA	614,797	760,200	81%	2253	2298	63.51
141	Denver-Boulder-Greeley, CO-KS-NE	3,533,639	4,371,053	81%	2341	2342	52.02
64	Chicago-Gary-Kenosha, IL-IN-WI	8,601,400	10,788,225	80%	2155	2178	556.54
19	Raleigh-Durham-Chapel Hill, NC	1,676,659	2,103,248	80%	2174	2191	188.38
24	Columbia, SC	788,950	990,706	80%	2221	2257	125.95

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EA	EA Name	Subscribers	2006 Estimated EA Population	2006 Penetration Rate	2006 HHI	2005 HHI	EA density
127	Dallas-Fort Worth, TX-AR-OK	6,909,660	8,611,698	80%	2560	2825	119.00
99	Kansas City, MO-KS	2,101,012	2,612,830	80%	2243	2328	88.73
97	Springfield, IL-MO	414,670	517,156	80%	3717	3589	58.20
70	Louisville, KY-IN	1,179,745	1,486,197	79%	2433	2572	180.92
71	Nashville, TN-KY	2,095,751	2,654,024	79%	2666	2526	105.12
86	Lake Charles, LA	424,169	537,895	79%	3087	2906	52.41
135	Odessa-Midland, TX	315,041	396,333	79%	3531	3483	10.13
143	Casper, WY-ID-UT	335,232	425,566	79%	4801	4577	5.17
51	Columbus, OH	1,925,404	2,470,645	78%	2827	2914	190.40
41	Greenville-Spartanburg-Anderson, SC-NC	1,032,581	1,327,395	78%	2785	2840	183.62
44	Knoxville, TN	824,497	1,059,725	78%	2658	2491	165.64
43	Chattanooga, TN-GA	592,705	757,439	78%	3066	2892	145.32
73	Memphis, TN-AR-MS-KY	1,528,138	1,950,206	78%	2678	2552	102.99
39	Columbus, GA-AL	395,902	510,111	78%	1997	2186	84.08
69	Evansville-Henderson, IN-KY-IL	674,579	863,622	78%	4256	4003	75.31
89	Monroe, LA	256,775	331,098	78%	4237	4051	56.12
50	Dayton-Springfield, OH	861,709	1,122,397	77%	2644	2662	318.52
67	Indianapolis, IN-IL	2,482,649	3,205,812	77%	3005	3021	171.37
98	Columbia, MO	296,460	385,614	77%	3898	3742	58.00
132	Corpus Christi, TX	432,348	561,071	77%	2984	3066	46.47
164	Sacramento-Yolo, CA	2,007,116	2,631,842	76%	2534	2567	188.08
96	St. Louis, MO-IL	2,788,313	3,665,461	76%	2736	2751	127.01
103	Cedar Rapids, IA	309,068	405,027	76%	2728	2862	101.33
158	Phoenix-Mesa, AZ-NM	3,189,046	4,194,873	76%	2091	2068	93.91
107	Minneapolis-St. Paul, MN-WI-IA	3,599,199	4,764,574	76%	1983	1910	82.98
167	Portland-Salem, OR-WA	2,431,279	3,192,725	76%	2401	2392	76.01
125	Oklahoma City, OK	1,346,541	1,773,714	76%	2926	2574	65.04
159	Tucson, AZ	848,908	1,117,199	76%	2005	2011	60.03
128	Abilene, TX	165,503	216,454	76%	3407	3449	20.35
55	Cleveland-Akron, OH-PA	3,502,429	4,653,348	75%	2371	2368	427.84
49	Cincinnati-Hamilton, OH-KY-IN	1,720,328	2,287,718	75%	2283	2357	294.08
18	Greensboro-Winston-Salem-High Point, NC-VA	1,474,258	1,959,239	75%	1990	1980	189.09
21	Greenville, NC	637,846	849,583	75%	2398	2660	87.74
75	Tupelo, MS-AL-TN	468,138	626,666	75%	5418	5034	49.76
137	Lubbock, TX	286,420	382,358	75%	2853	2841	27.17
136	Hobbs, NM-TX	145,487	194,047	75%	3516	3283	11.21
154	Flagstaff, AZ-UT	348,669	465,163	75%	2731	2782	8.24
151	Reno, NV-CA	567,446	756,248	75%	2263	2282	7.56
63	Milwaukee-Racine, WI	1,699,602	2,291,149	74%	2222	2344	366.88
53	Pittsburgh, PA-WV	2,148,796	2,912,189	74%	2914	2887	284.77
93	Joplin, MO-KS-OK	202,100	274,103	74%	3377	3162	74.68
124	Tulsa, OK-KS	1,058,159	1,428,505	74%	2925	2694	72.44
38	Macon, GA	595,789	805,387	74%	2594	2242	62.88
37	Albany, GA	362,514	487,704	74%	2163	2306	62.74
88	Shreveport-Bossier City, LA-AR	426,752	579,719	74%	3469	3389	57.96
77	Jackson, MS-AL-LA	1,085,716	1,471,597	74%	3276	3108	49.67
156	Albuquerque, NM-AZ	747,680	1,009,001	74%	2039	2046	20.89
11	Harrisburg-Lebanon-Carlisle, PA	868,975	1,193,202	73%	3175	3028	292.42

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EA	EA Name	Subscribers	2006 Estimated EA Population	2006 Penetration Rate	2006 HHI	2005 HHI	EA density
101	Peoria-Pekin, IL	382,555	525,284	73%	3308	3343	90.99
27	Augusta-Aiken, GA-SC	458,941	625,827	73%	2063	2021	89.79
36	Dothan, AL-FL-GA	250,446	342,549	73%	2062	2039	53.70
152	Salt Lake City-Ogden, UT-ID	1,721,148	2,363,918	73%	2206	2192	35.68
148	Idaho Falls, ID-WY	244,196	334,087	73%	2415	2522	10.85
142	Scottsbluff, NE-WY	65,541	89,205	73%	6258	6440	7.81
45	Johnson City-Kingsport-Bristol, TN-VA	427,115	592,038	72%	2190	2134	144.51
102	Davenport-Moline-Rock Island, IA-IL	400,859	560,020	72%	2601	2666	108.27
59	Green Bay, WI-MI	490,667	683,597	72%	2311	2583	34.15
126	Western Oklahoma, OK	97,420	135,405	72%	2366	2574	12.04
56	Toledo, OH	908,645	1,285,878	71%	3181	3049	163.94
68	Champaign-Urbana, IL	443,538	625,420	71%	3095	3097	73.47
106	Rochester, MN-IA-WI	237,057	333,515	71%	3058	3246	55.65
150	Boise City, ID-OR	479,367	679,007	71%	2679	2643	13.69
66	Fort Wayne, IN	517,943	741,911	70%	3161	3294	158.50
60	Appleton-Oshkosh-Neenah, WI	320,065	455,508	70%	1895	2118	143.62
5	Albany-Schenectady-Troy, NY	845,237	1,202,898	70%	3170	3138	134.71
2	Portland, ME	545,563	784,684	70%	2488	2479	98.56
118	Omaha, NE-IA-MO	769,459	1,091,773	70%	2146	2310	62.40
90	Little Rock-North Little Rock, AR	1,171,000	1,669,953	70%	4563	4163	46.09
166	Eugene-Springfield, OR-CA	589,801	837,817	70%	1858	1882	43.10
122	Wichita, KS-OK	820,965	1,176,986	70%	1716	2154	20.49
116	Sioux Falls, SD-IA-MN-NE	377,059	536,935	70%	4174	3754	15.11
149	Twin Falls, ID	121,091	173,626	70%	2302	2413	14.08
144	Billings, MT-WY	298,158	428,621	70%	4826	4581	4.89
8	Buffalo-Niagara Falls, NY-PA	1,011,096	1,466,311	69%	3052	2980	212.89
17	Roanoke, VA-NC-WV	584,250	842,375	69%	1892	1988	97.83
104	Madison, WI-IL-IA	682,575	987,120	69%	3515	4009	71.33
72	Paducah, KY-IL	159,014	229,204	69%	5631	5630	70.02
119	Lincoln, NE	272,878	394,579	69%	4469	5484	50.24
94	Springfield, MO	635,394	927,518	69%	3510	3350	48.14
111	Minot, ND	72,455	105,411	69%	3977	3858	7.00
62	Grand Rapids-Muskegon-Holland, MI	1,333,951	1,958,959	68%	2832	2926	206.76
46	Hickory-Morganton, NC-TN	365,460	541,288	68%	2542	2500	131.90
14	Salisbury, MD-DE-VA	272,950	399,869	68%	5018	5101	111.17
16	Staunton, VA-WV	232,950	344,961	68%	1974	2036	50.99
100	Des Moines, IA-IL-MO	1,171,658	1,713,976	68%	2789	2947	47.32
108	Wausau, WI	333,727	492,677	68%	2221	2177	34.13
139	Santa Fe, NM	184,856	273,051	68%	2904	3031	13.06
138	Amarillo, TX-NM	336,086	491,728	68%	2309	2039	11.79
146	Missoula, MT	290,019	425,808	68%	5276	4737	10.79
65	Elkhart-Goshen, IN-MI	643,304	959,273	67%	2335	2436	185.73
7	Rochester, NY-PA	991,969	1,486,819	67%	4187	4017	167.21
6	Syracuse, NY-PA	1,273,292	1,899,908	67%	3771	3667	104.74
157	El Paso, TX-NM	696,715	1,032,679	67%	2106	2403	33.04
147	Spokane, WA-ID	595,575	890,868	67%	2931	2815	23.63
162	Fresno, CA	1,058,165	1,604,163	66%	2988	3122	98.64
61	Traverse City, MI	200,731	303,189	66%	4390	4220	50.67

EA	EA Name	Subscribers	2006 Estimated EA Population	2006 Penetration Rate	2006 HHI	2005 HHI	EA density
91	Fort Smith, AR-OK	226,769	345,853	66%	4053	3860	46.51
117	Sioux City, IA-NE-SD	166,250	251,204	66%	3911	3671	39.51
169	Richland-Kennewick-Pasco, WA	489,277	742,672	66%	2537	2583	27.68
165	Redding, CA-OR	240,566	362,763	66%	2347	2325	14.36
120	Grand Island, NE	188,640	287,280	66%	6418	9043	11.56
110	Grand Forks, ND-MN	147,363	223,433	66%	3880	3922	10.16
112	Bismarck, ND-MT-SD	116,421	177,241	66%	4819	4838	6.26
92	Fayetteville-Springdale-Rogers, AR-MO-OK	315,261	483,254	65%	4316	3960	88.43
95	Jonesboro, AR-MO	198,169	304,222	65%	5195	4773	51.30
113	Fargo-Moorhead, ND-MN	246,837	379,861	65%	3145	3008	16.40
140	Pueblo, CO-NM	186,852	288,249	65%	2583	2654	8.71
47	Lexington, KY-TN-VA-WV	1,210,556	1,905,583	64%	2958	2768	80.39
115	Rapid City, SD-MT-NE-ND	141,016	221,503	64%	4850	4688	5.04
171	Anchorage, AK	430,144	670,053	64%	3925	4198	1.07
9	State College, PA	504,994	801,512	63%	4152	4035	92.41
4	Burlington, VT-NY	391,333	621,204	63%	4893	4885	57.62
123	Topeka, KS	287,104	452,851	63%	1757	2308	35.62
109	Duluth-Superior, MN-WI	218,541	348,926	63%	3440	3464	18.53
133	McAllen-Edinburg-Mission, TX	722,086	1,170,776	62%	3637	3423	221.96
52	Wheeling, WV-OH	194,517	313,052	62%	4113	4158	124.54
48	Charleston, WV-KY-OH	721,730	1,187,284	61%	2655	2590	85.35
1	Bangor, ME	329,808	536,890	61%	4693	4932	20.94
54	Erie, PA	304,423	513,321	59%	4037	4255	116.41
105	La Crosse, WI-MN	147,322	249,383	59%	3551	4008	53.67
121	North Platte, NE-CO	36,114	60,833	59%	6551	8720	4.95
145	Great Falls, MT	94,306	162,144	58%	4602	4409	4.23
76	Greenville, MS	132,324	234,537	56%	3540	3249	40.96
58	Northern Michigan, MI	152,977	273,251	56%	4637	4437	28.53
114	Aberdeen, SD	*	78,800	56%	*	*	5.39
168	Pendleton, OR-WA	109,864	204,381	54%	2472	2861	8.67
129	San Angelo, TX	102,036	204,176	50%	3290	3167	10.05

*Data withheld to maintain firm confidentiality.

Source: Federal Communications Commission internal analysis based on preliminary year-end 2006 filings for Numbering Resource Utilization in the United States. Density is persons per square mile. EA populations are based on Census estimates as of July 1, 2006. EA penetration rates are not directly comparable with previous year reports since, in previous years, EA populations were based on Census 2000.

Note: The penetration rate in EA83 (New Orleans) appears to be an aberration. That EA lost over 260,000 people between 2000 and 2006, while its subscriber count remained relatively unchanged, creating a large increase in its penetration rate. One explanation for this may be that, after the flooding, people leaving the area took their cell phones (and cell phone numbers) with them. Thus, those numbers may still be associated with New Orleans rate centers, even though the people actually no longer live anywhere near there.

**Table A - 4: Top 20 Mobile Telephone Operators by Subscribers
(with publicly-available subscriber counts, in thousands)**

Year-End 2005			Year-End 2006	
	Operator	Total	Operator	Total
1	Cingular Wireless	54,144	AT&T/Cingular Wireless	60,962
2	Verizon Wireless	51,337	Verizon Wireless	59,052
3	Sprint Nextel	44,815	Sprint Nextel (3)	52,175
4	T-Mobile	21,690	T-Mobile	25,041
5	Alltel	10,662	Alltel (4)	11,824
6	US Cellular	4,945	US Cellular	5,815
7	Nextel Partners (2)	2,018	MetroPCS	2,941
8	MetroPCS	2,000	Leap	2,229
9	Leap	1,668	Dobson Comm. (5)	1,667
10	Dobson Comm.	1,543	SunCom (7)	1,087
11	Centennial	1,338	Centennial (1)	1,059
12	Alamosa PCS (2)	1,000	Rural Cellular (6)	706
13	SunCom	966	iPCS	562
14	Rural Cellular	706	American Movil / Claro	554
15	Cellular South	500	Cincinnati Bell Wireless	528
16	Cincinnati Bell Wireless	496	Ntelos	367
17	iPCS	495	SouthernLINC	300
18	Ubiquitel (2)	448	Shenendoah Telecomm.	203
19	Midwest Wireless (4)	440	Pocket Comm. (8)	175
20	Ntelos	336	Edge Wireless (8)	172

Sources: For 2005, see *Eleventh Report*, at 11039. For 2006, publicly available company documents such as operators' news releases and filings made with the Securities and Exchange Commission. Paul Davidson, *Rural Cellphone Firms Pinched*, USA Today, May 24, 2006 (SouthernLINC Wireless); *América Móvil Completes Takeover Of PRT, Rebrands Mobile Arm As Claro*, TELEGEOGRAPHY'S COMMSUPDATE, Apr. 2, 2007, available at <http://www.telegeography.com/cu/article.php?article_id=17275> (visited July 27, 2007); Sanford Nowlin, *New Executive Revamps Pocket*, San Antonio Express News, Nov. 14, 2007, available at <<http://www.mysanantonio.com/business/stories/MYSA111507.01E.pocket.1ee720b.html>> (visited Dec. 4, 2007) (Pocket Comm.); *AT&T Swaps Assets with Verizon; Buys Edge Wireless*, COMMUNICATIONS DAILY, Dec. 5, 2007, at 6 (Edge Wireless).

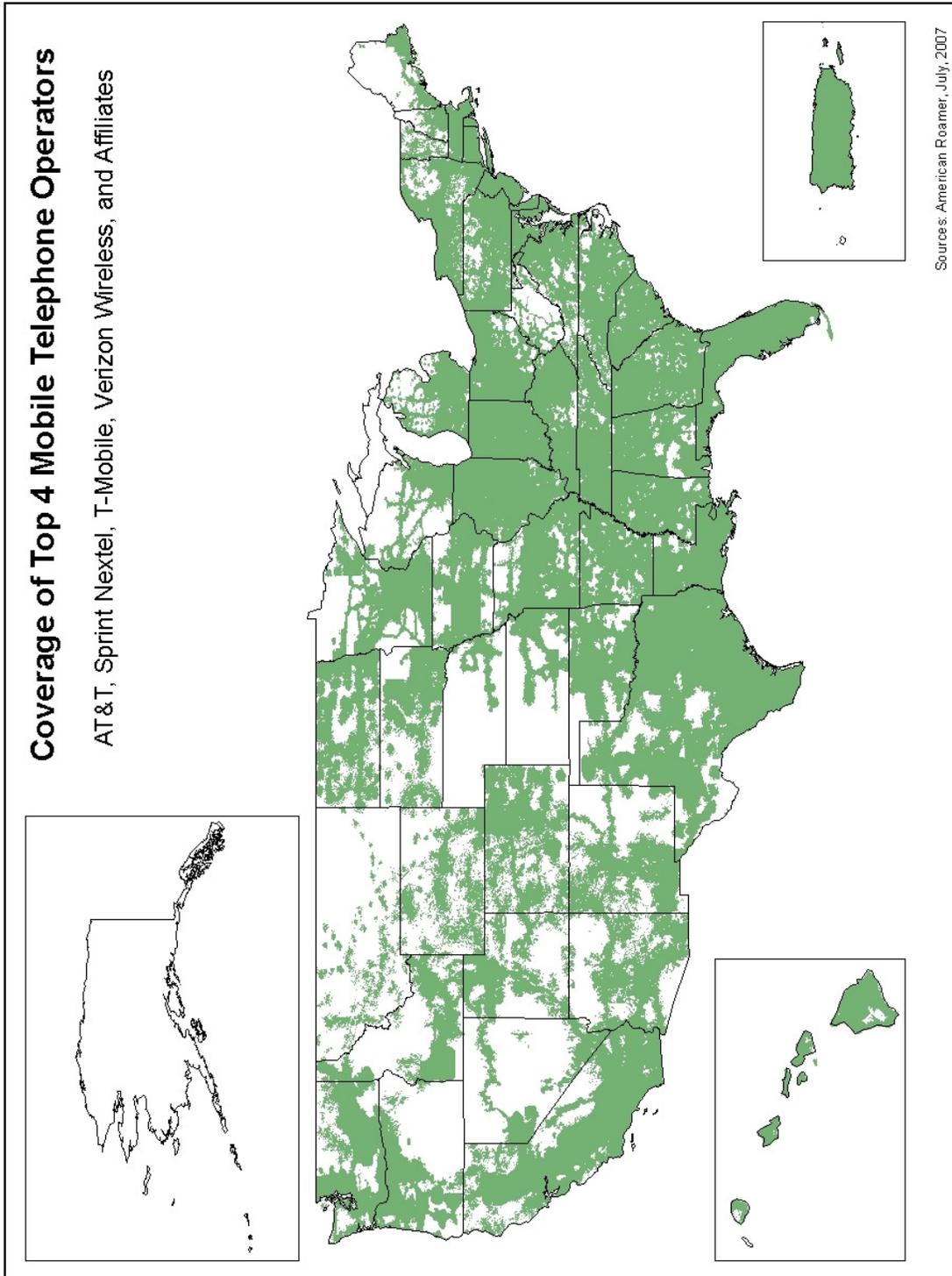
Notes

- (1) As of Nov. 30, 2004, includes Puerto Rico, the US Virgin Islands, and the Dominican Republic.
- (2) Sprint Nextel completed its acquisition of Alamosa on Feb. 1, 2006, Nextel Partners on June 26, 2006, and Ubiquitel on July 1, 2006.
- (3) This includes direct and wholesale subscribers (including Boost subscribers), but not affiliate company subscribers.
- (4) On October 3, 2006, Alltel completed its acquisition of Midwest Wireless.
- (5) On June 29, 2007, AT&T announced that it was acquiring Dobson Communications.
- (6) On July 30, 2007, Verizon Wireless announced that it was acquiring Rural Cellular.
- (7) On September 17, 2007, T-Mobile announced that it was acquiring SunCom.
- (8) As of late 2007.

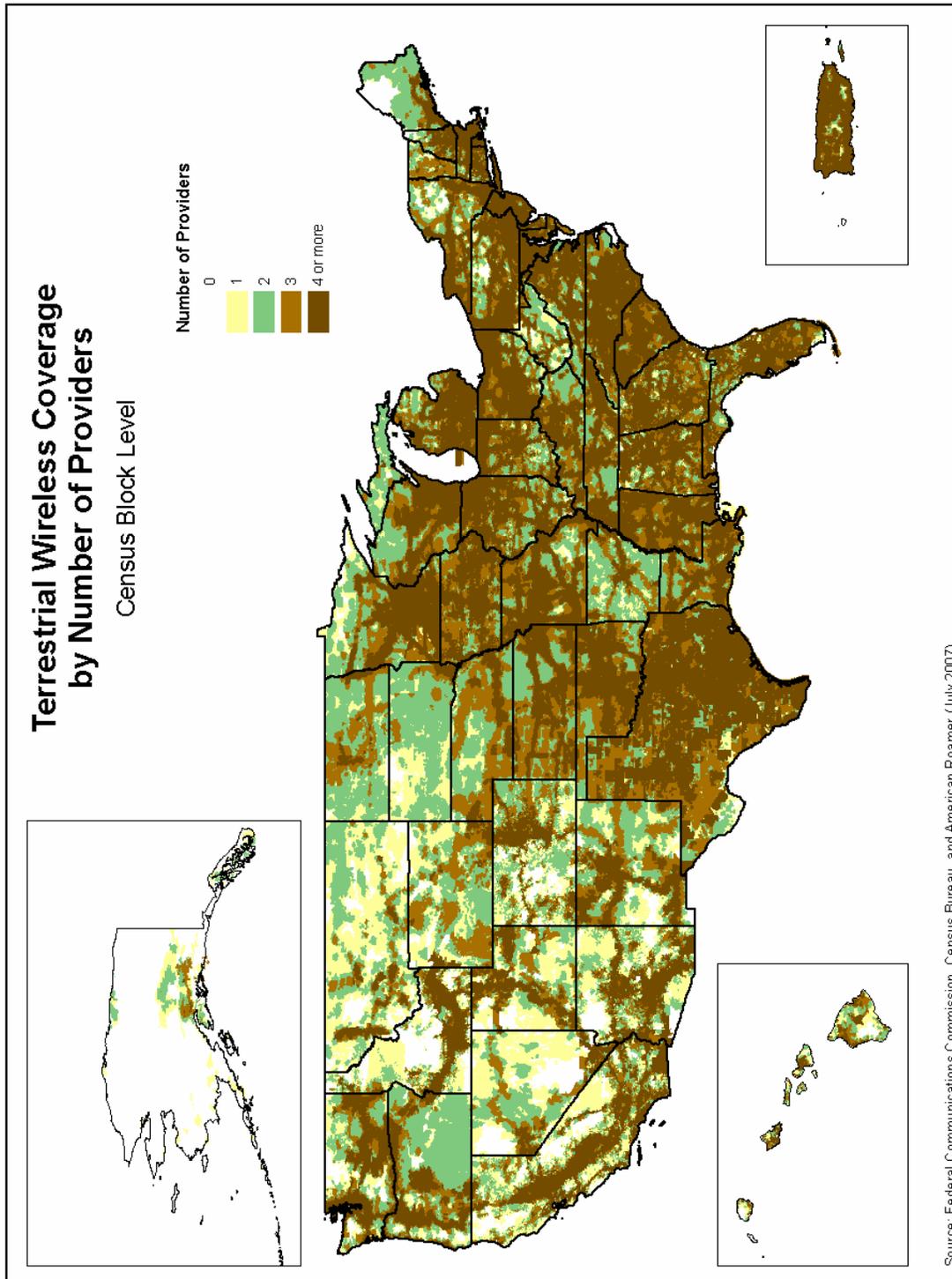
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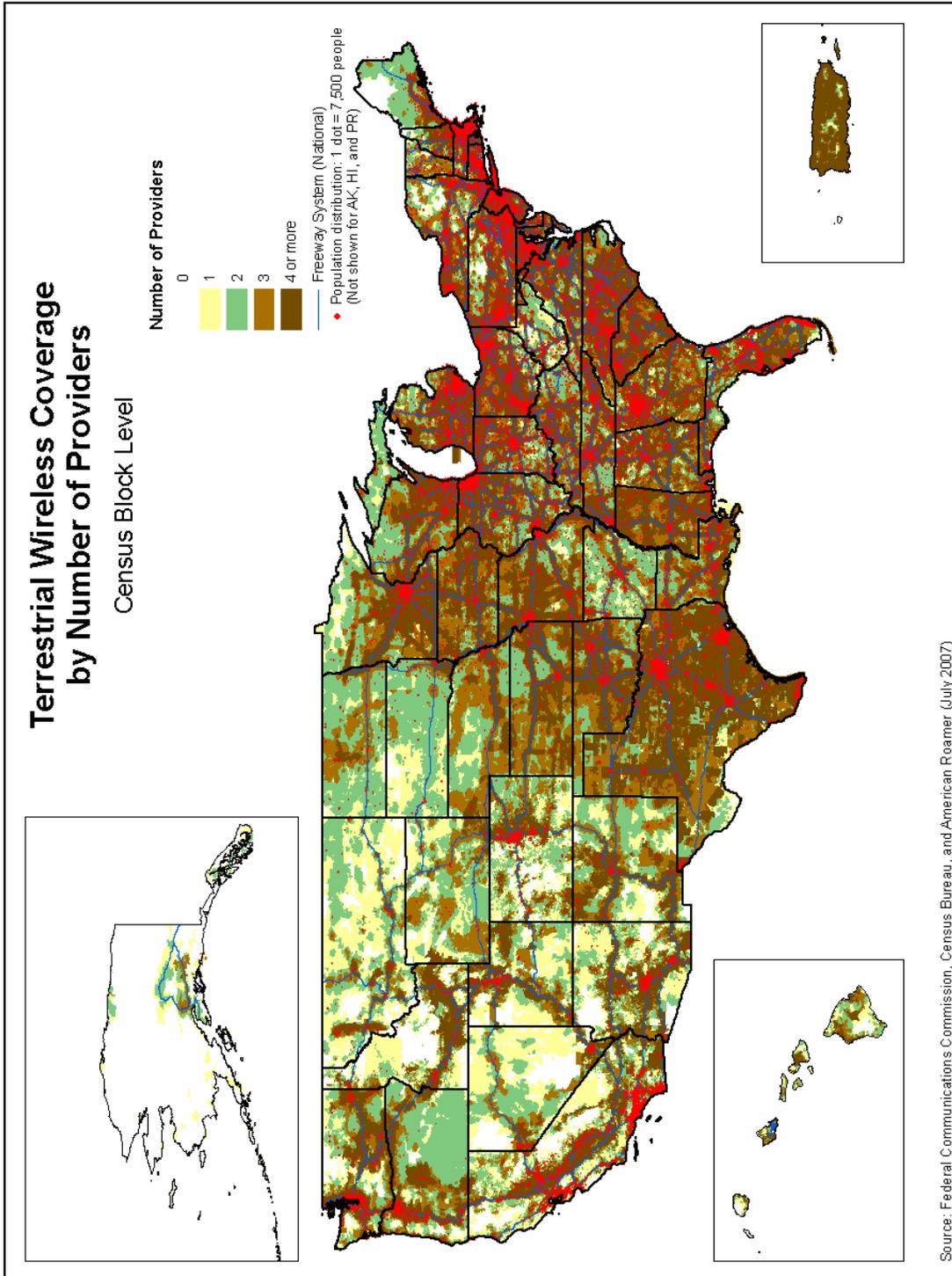
Map B-1: Coverage of Top 4 Mobile Telephone Operators



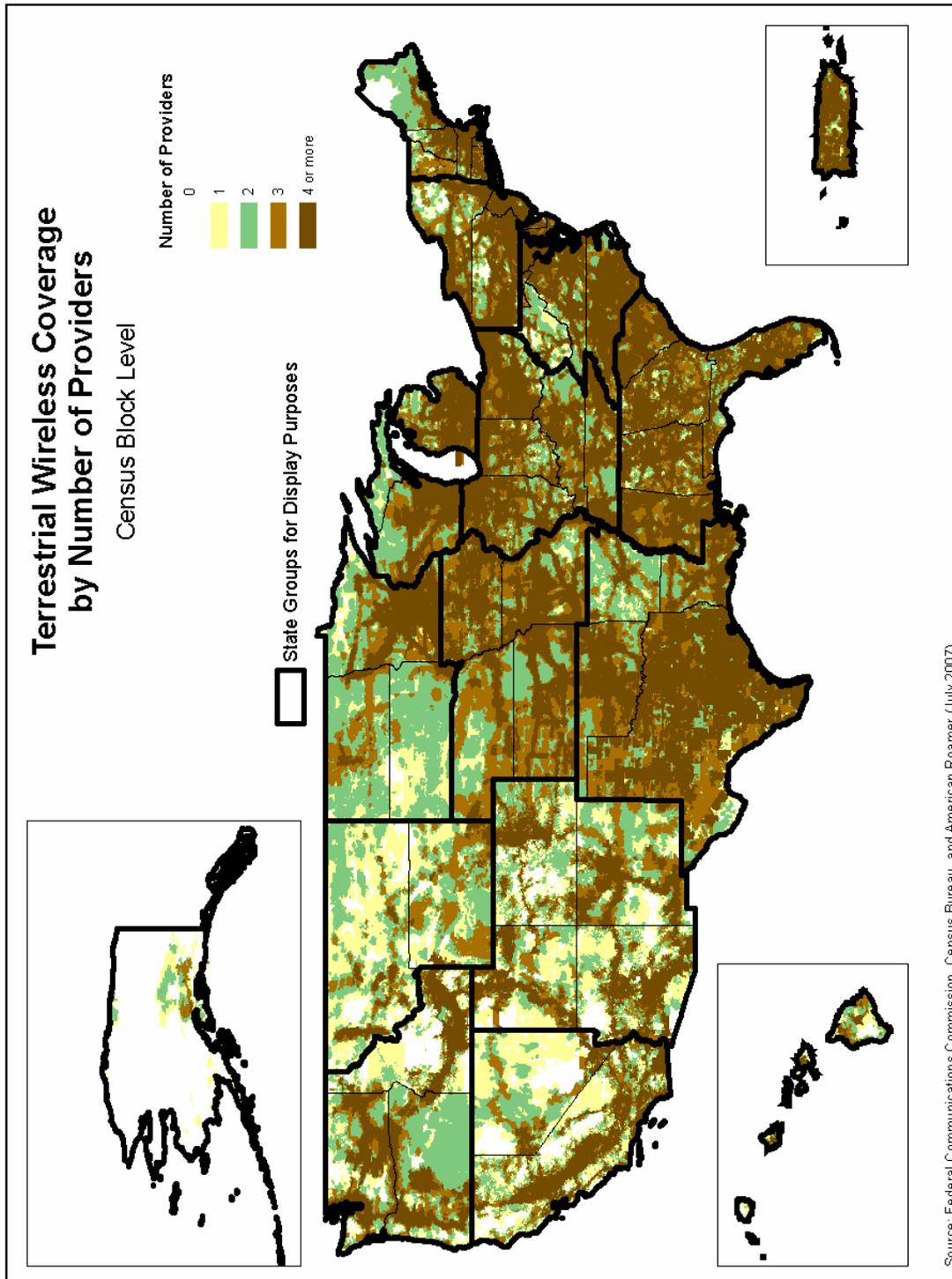
Map B-2: Wireless Coverage by Number of Providers



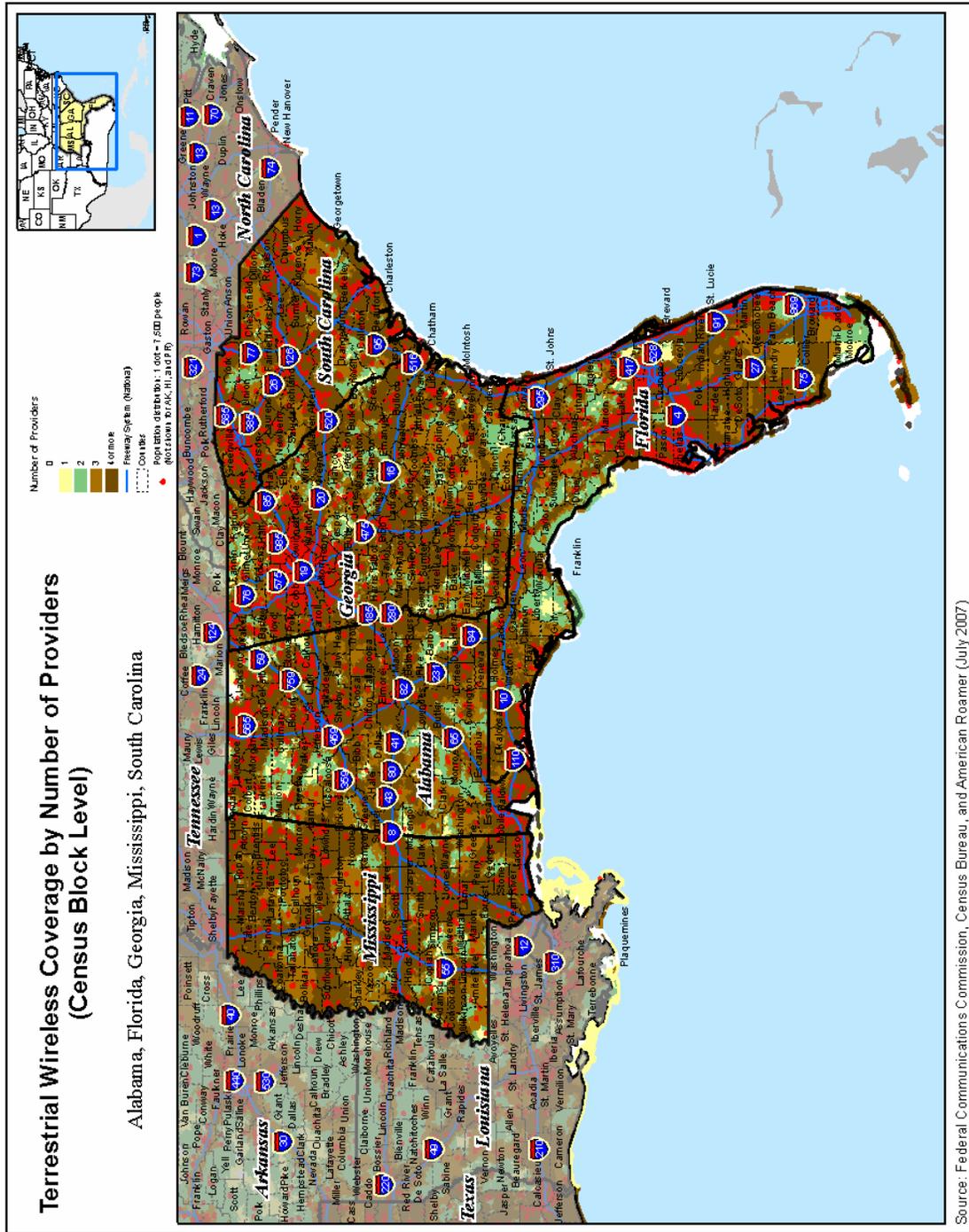
Map B-3: Wireless Coverage by Number of Providers (2)



Map B-4: Wireless Coverage by Number of Providers By Region (overview)

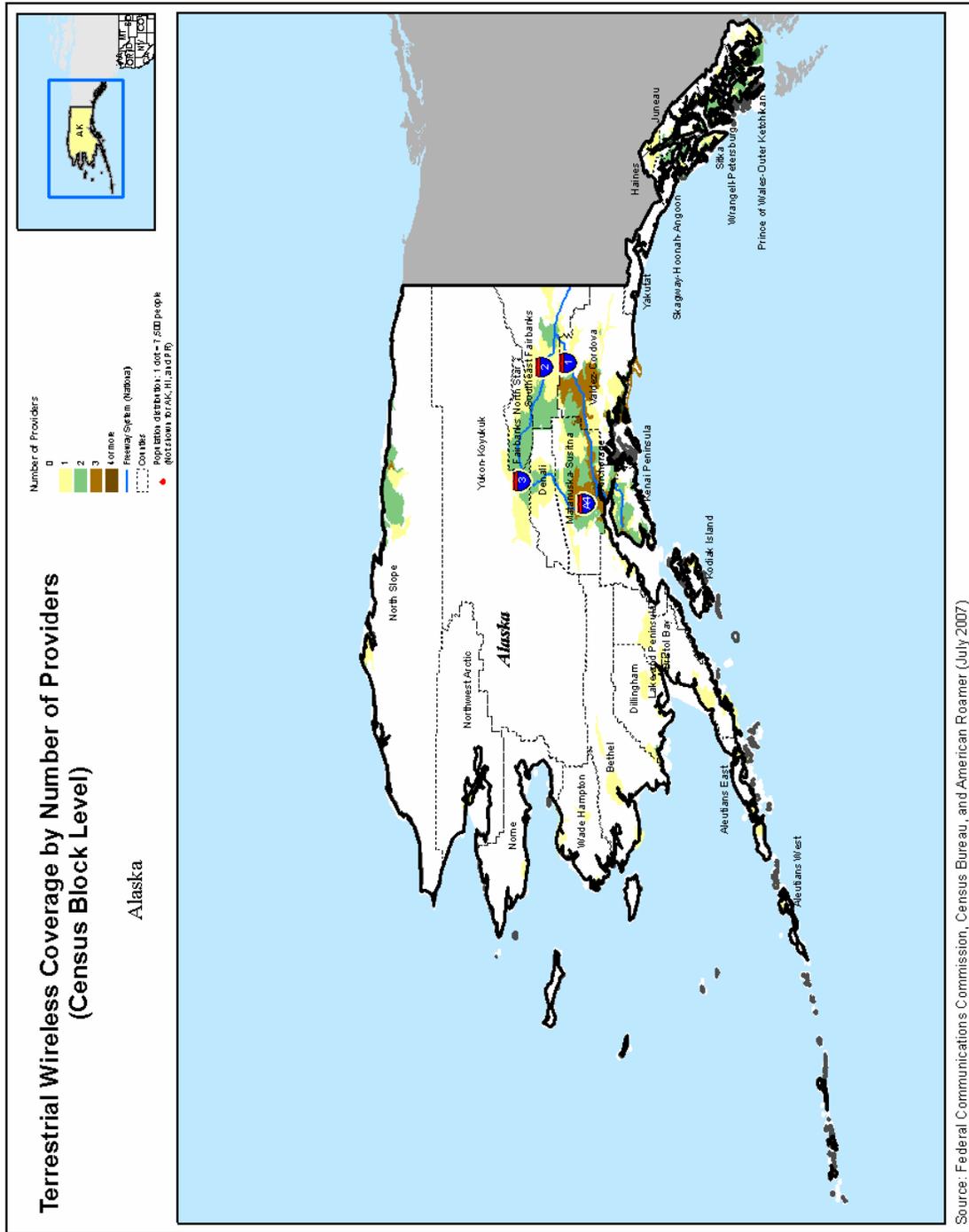


Map B-5: Wireless Coverage by Number of Providers By Region (1)

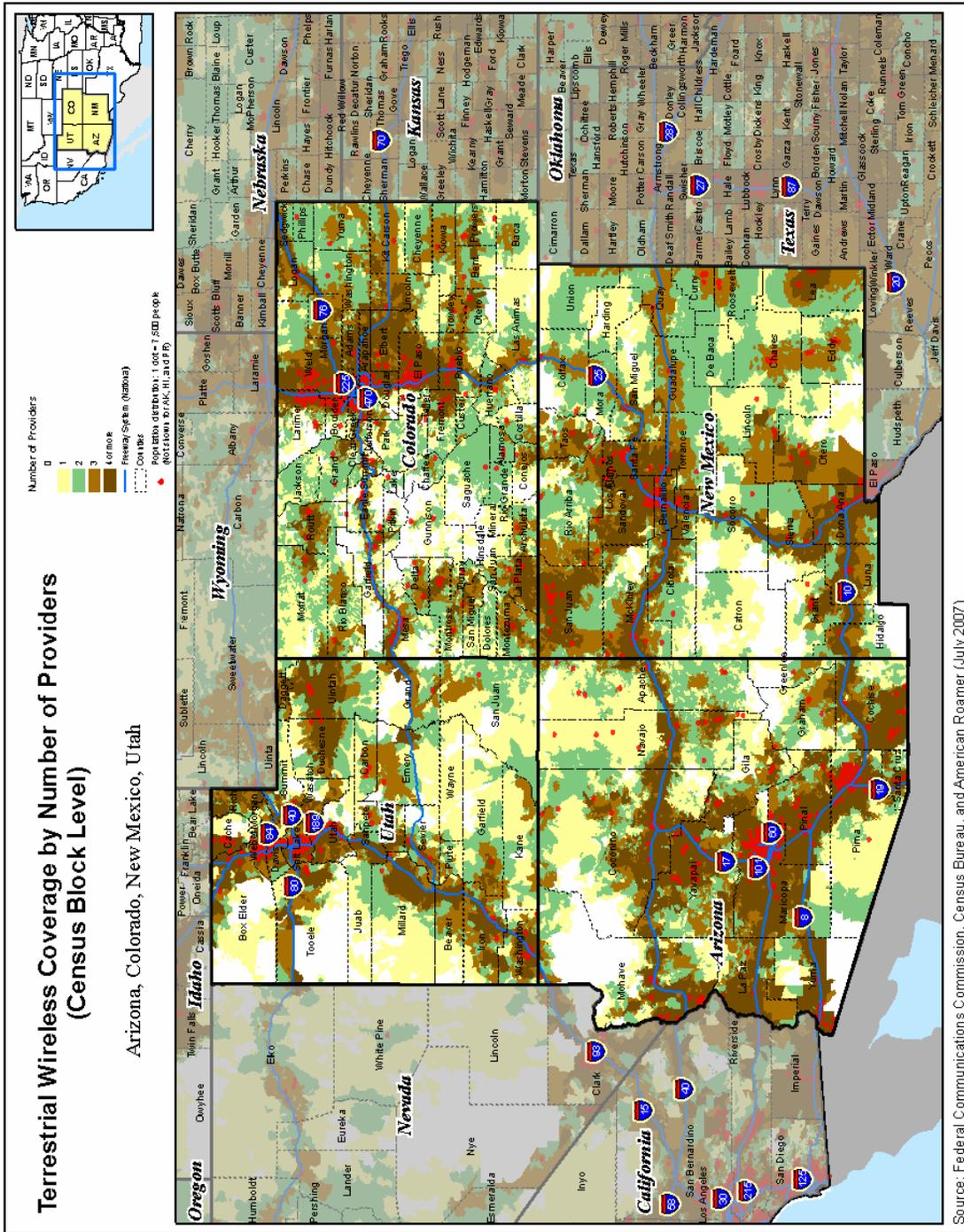


Source: Federal Communications Commission, Census Bureau, and American Roamer (July 2007)

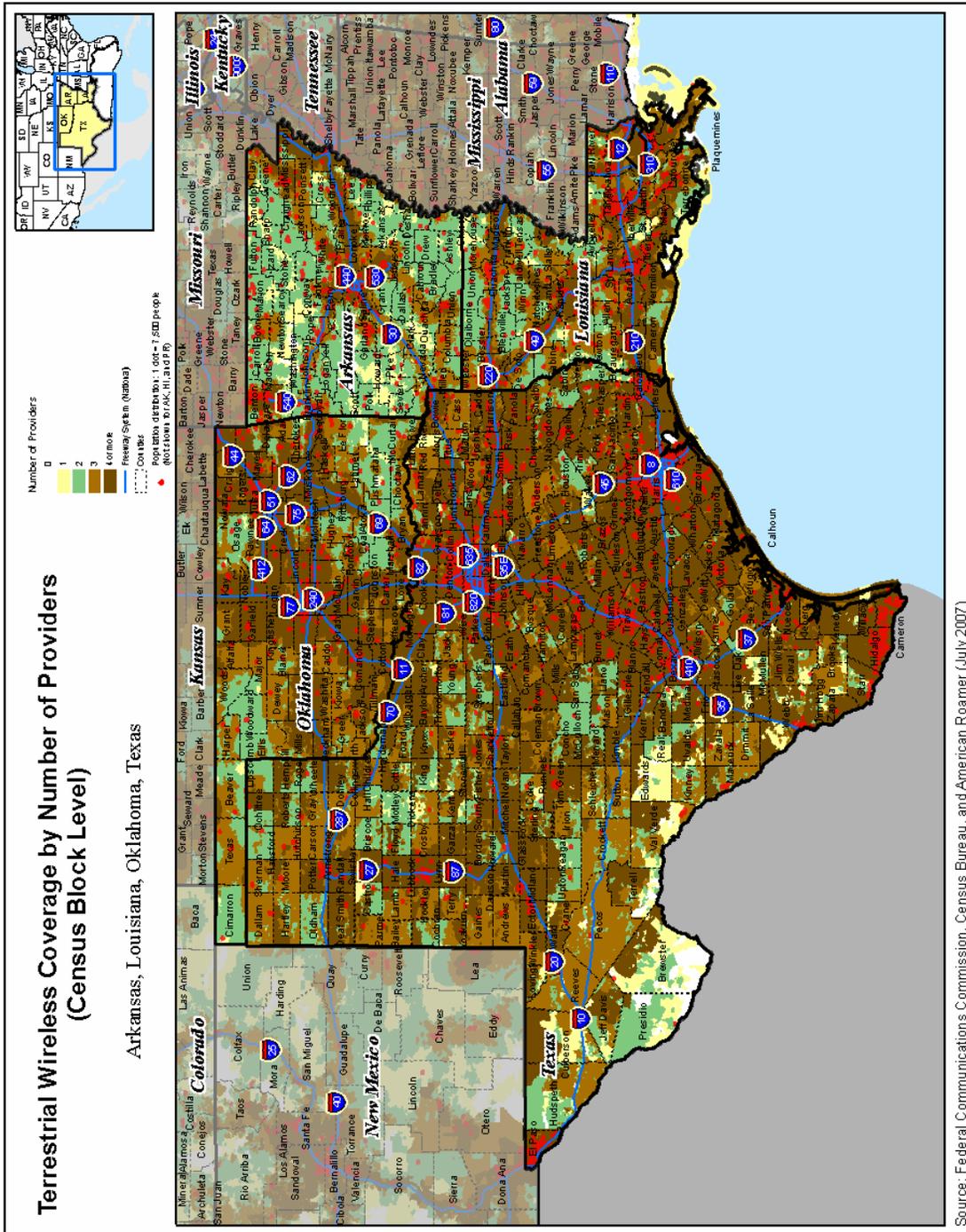
Map B-6: Wireless Coverage by Number of Providers By Region (2)



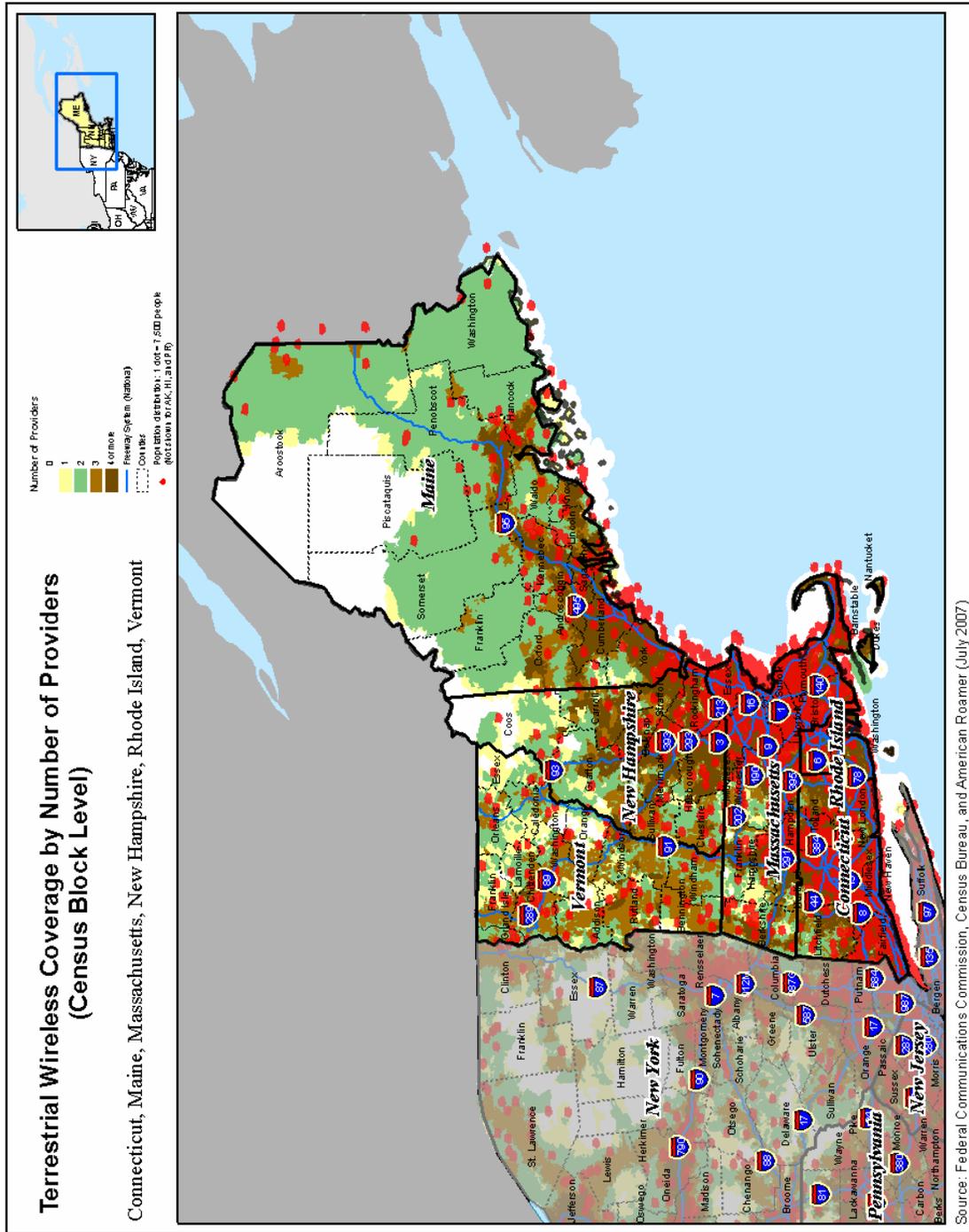
Map B-7: Wireless Coverage by Number of Providers By Region (3)



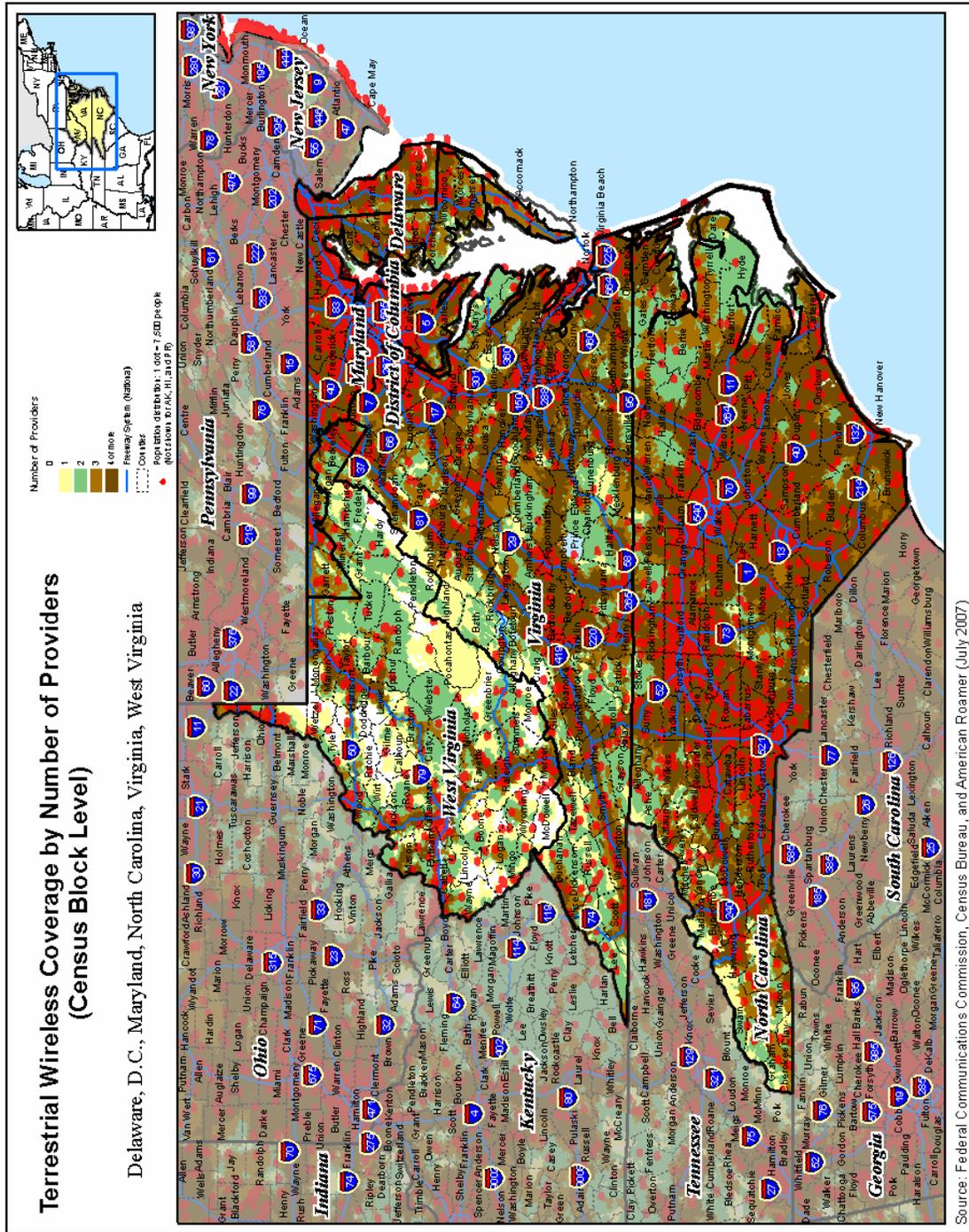
Map B-8: Wireless Coverage by Number of Providers By Region (4)



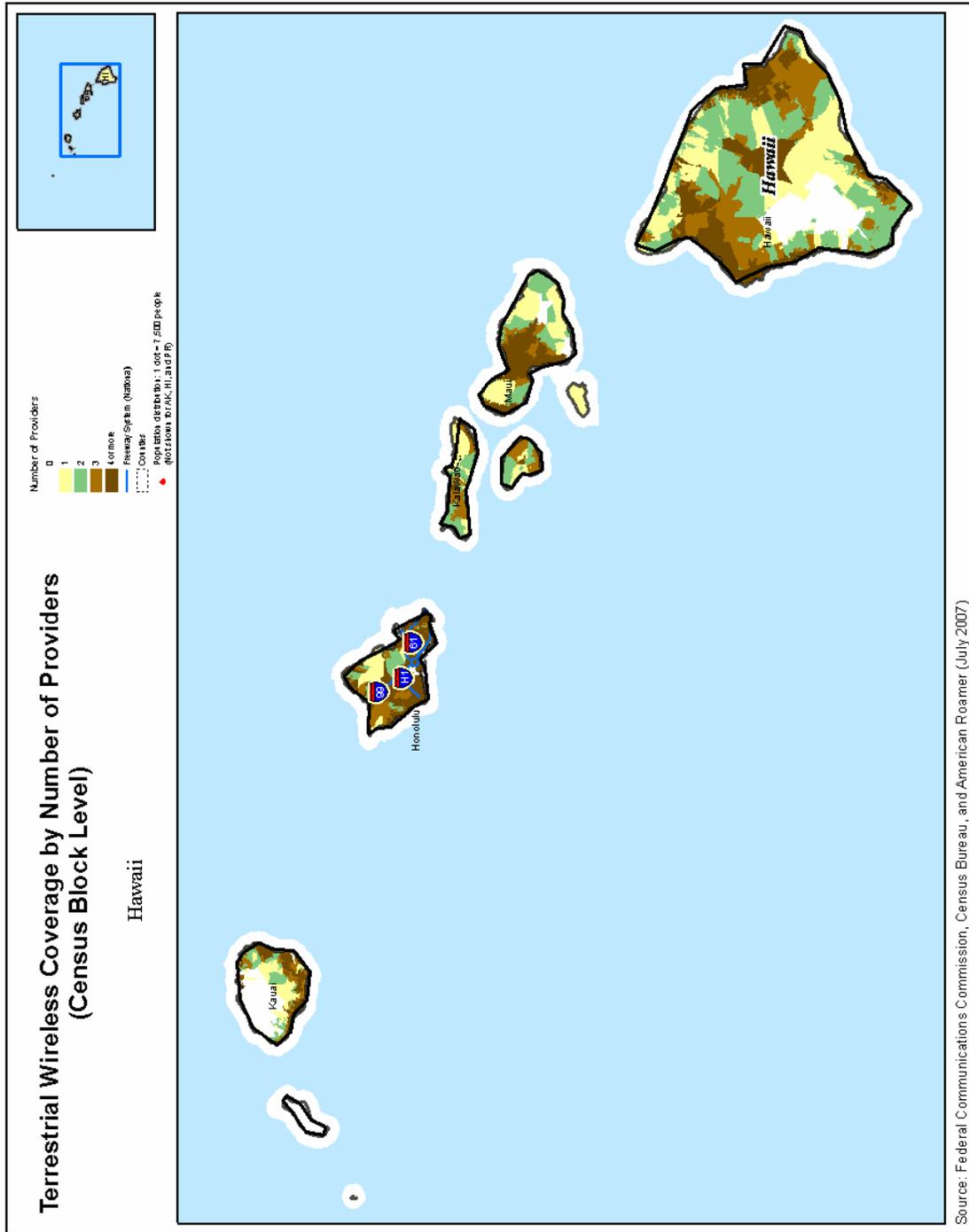
Map B-10: Wireless Coverage by Number of Providers By Region (6)



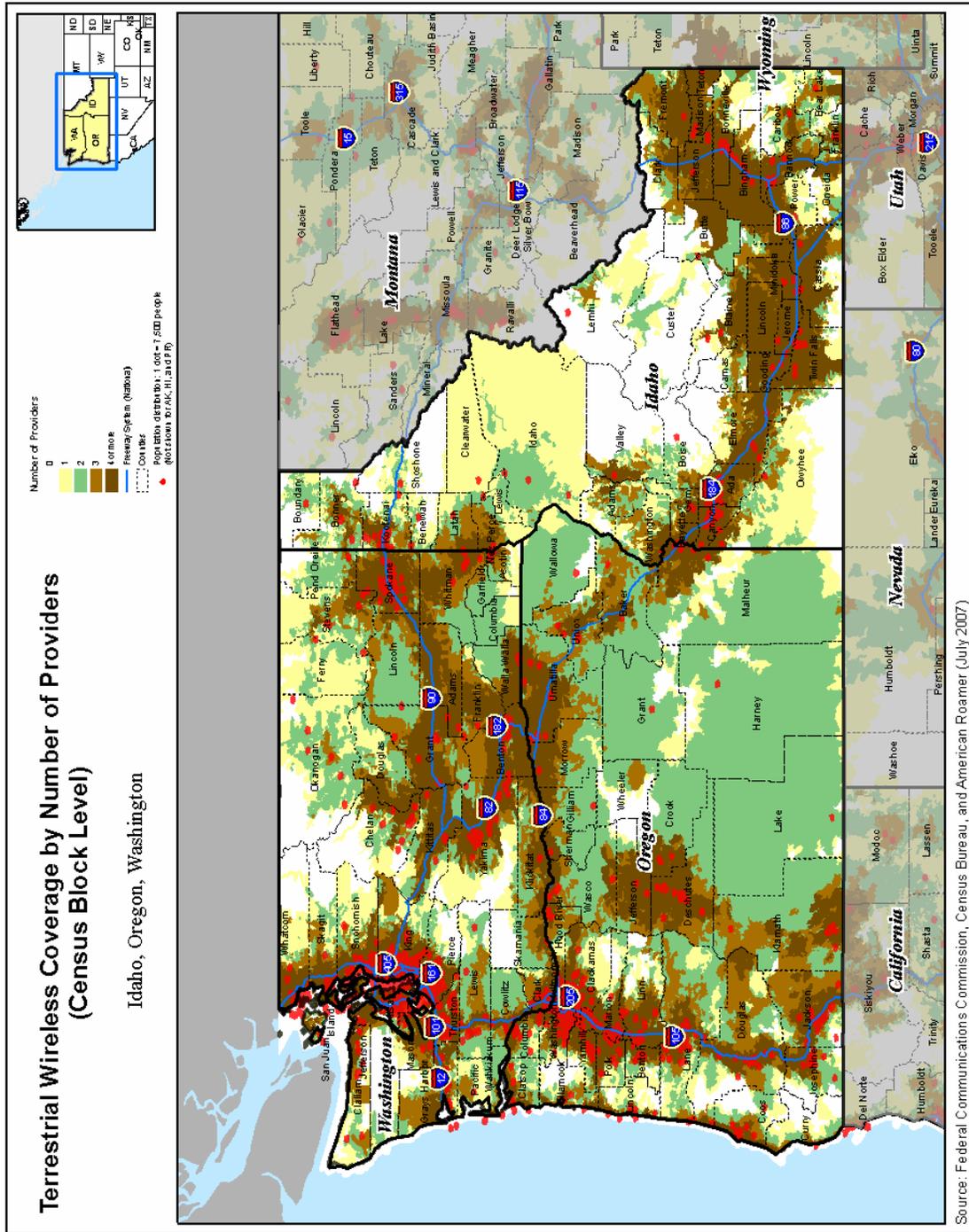
Map B-11: Wireless Coverage by Number of Providers By Region (7)



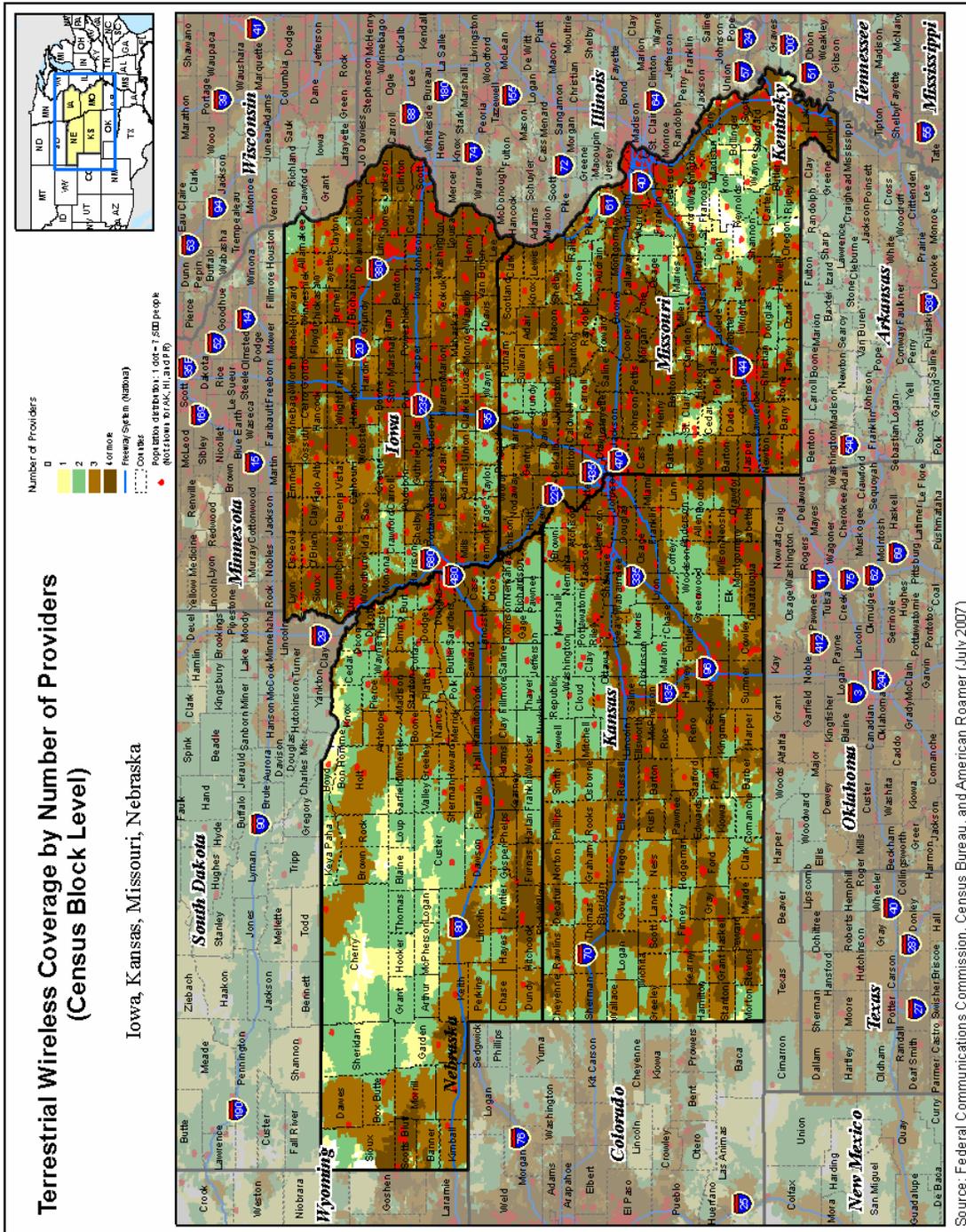
Map B-12: Wireless Coverage by Number of Providers By Region (8)



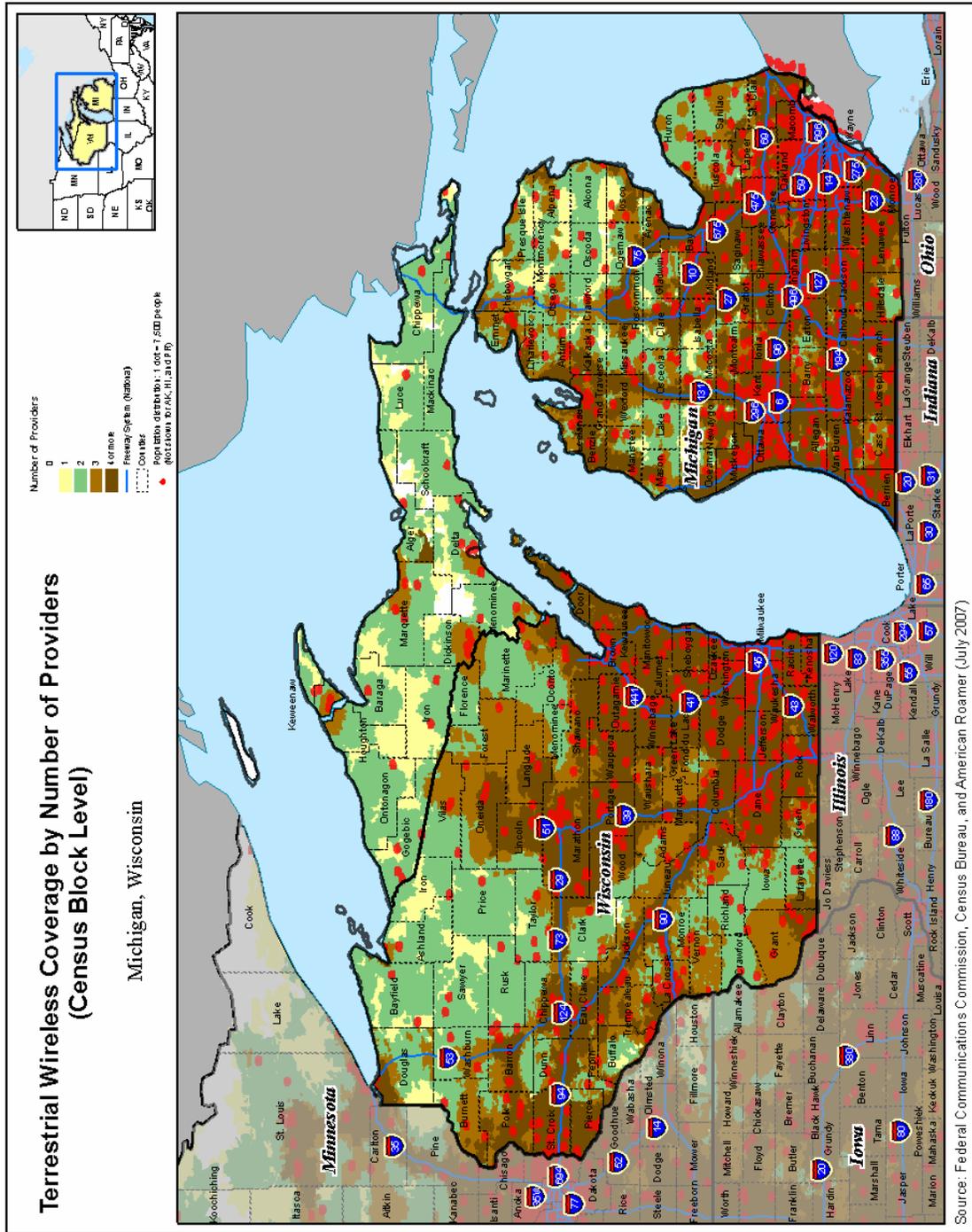
Map B-13: Wireless Coverage by Number of Providers By Region (9)



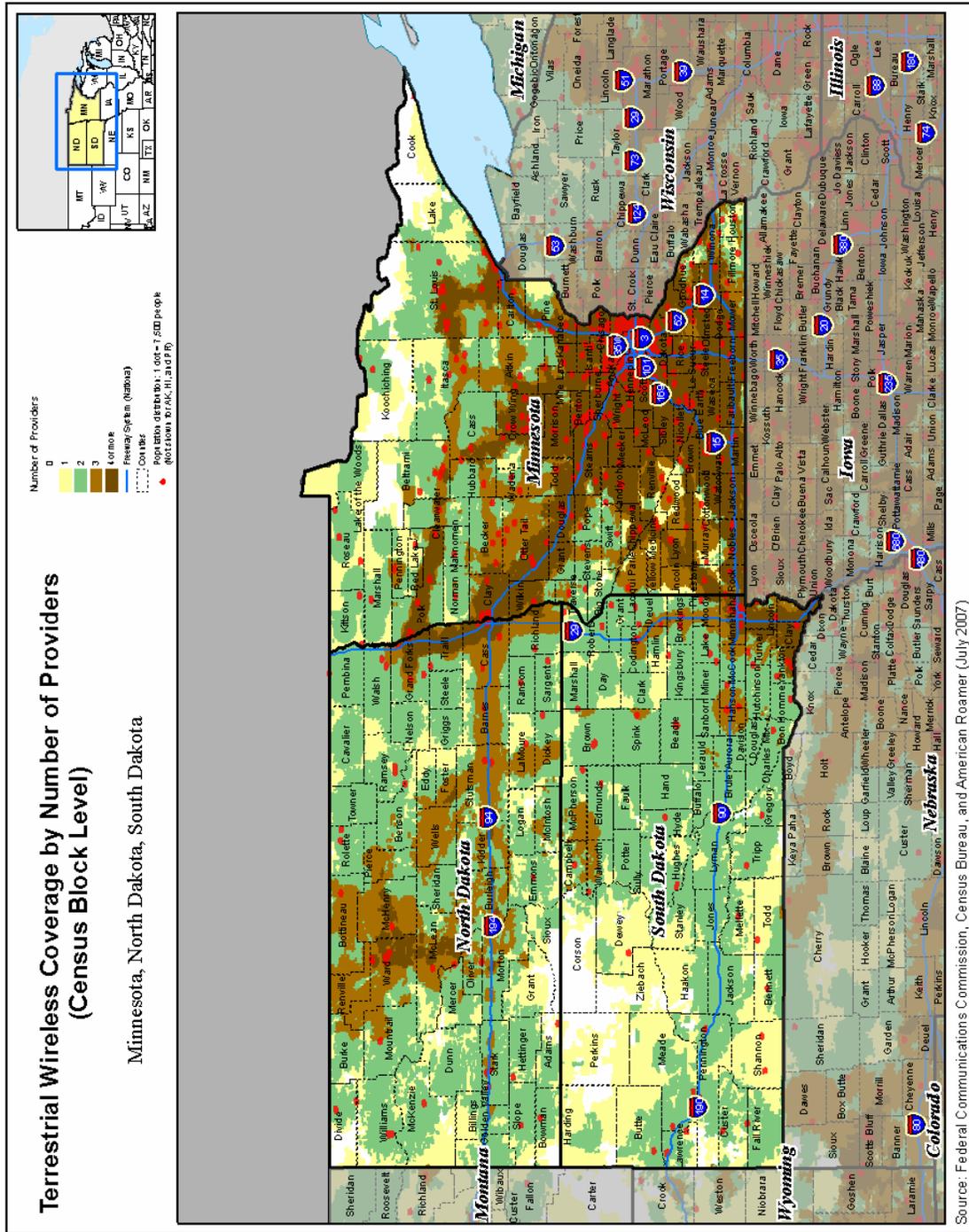
Map B-15: Wireless Coverage by Number of Providers By Region (11)



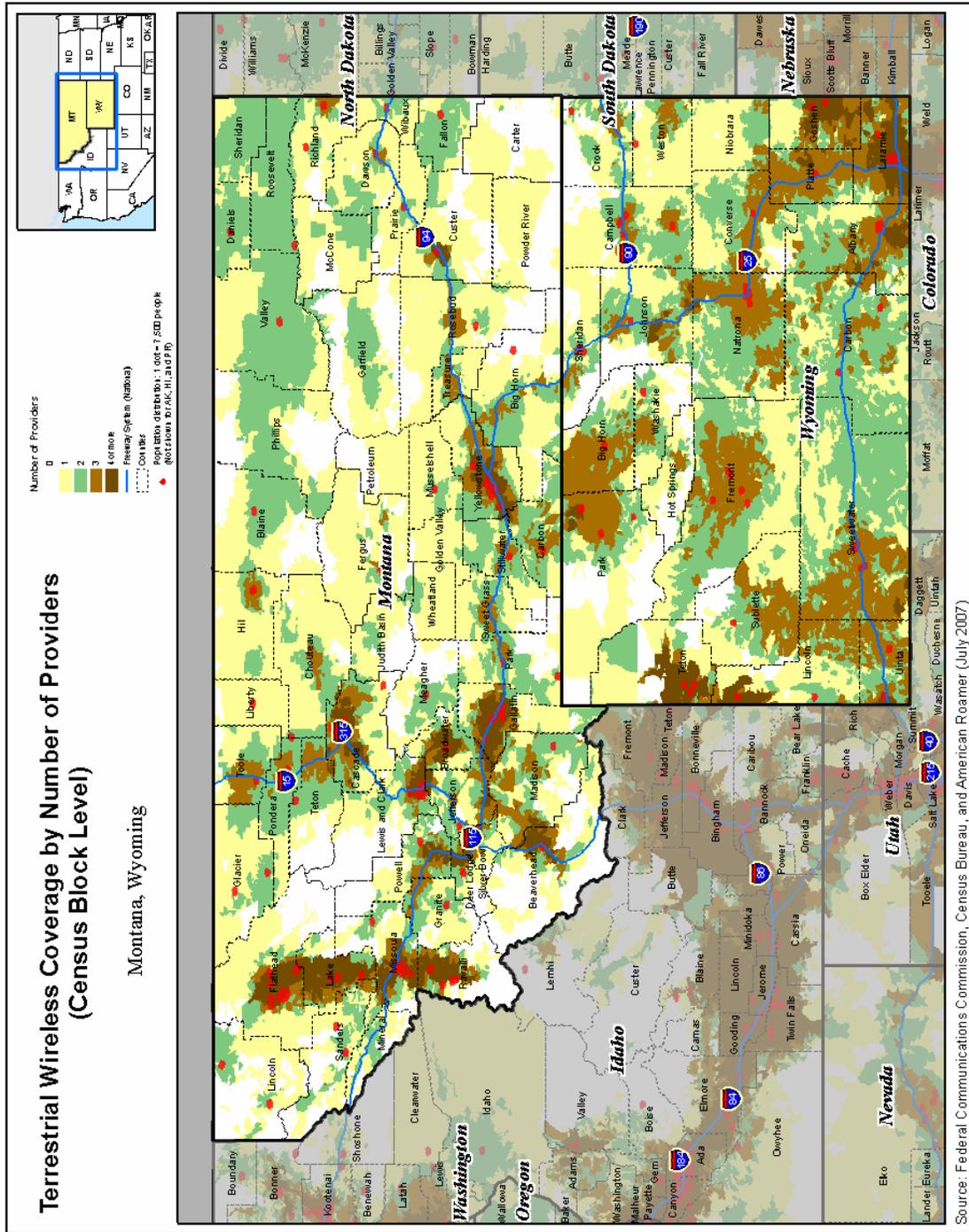
Map B-16: Wireless Coverage by Number of Providers By Region (12)



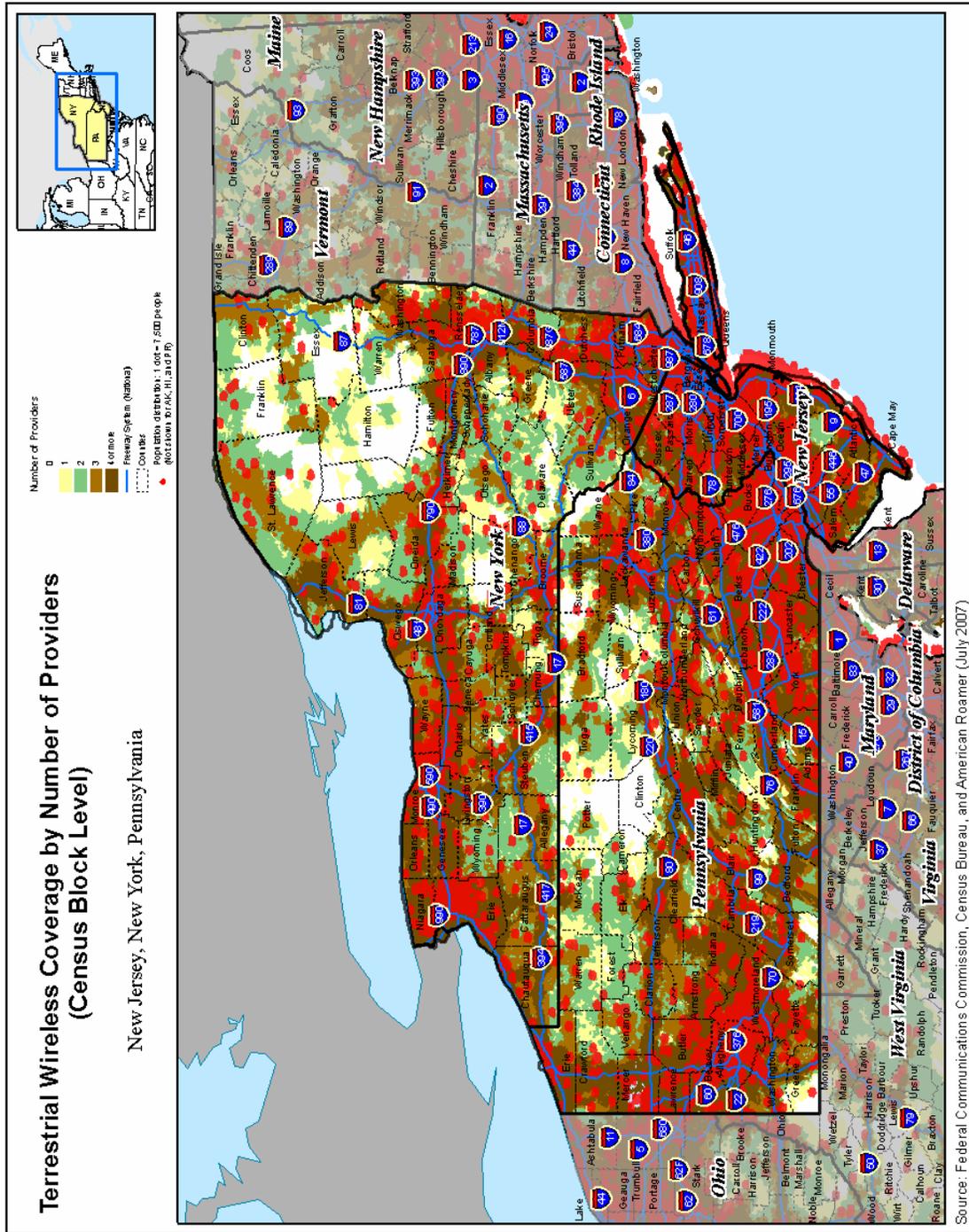
Map B-17: Wireless Coverage by Number of Providers By Region (13)



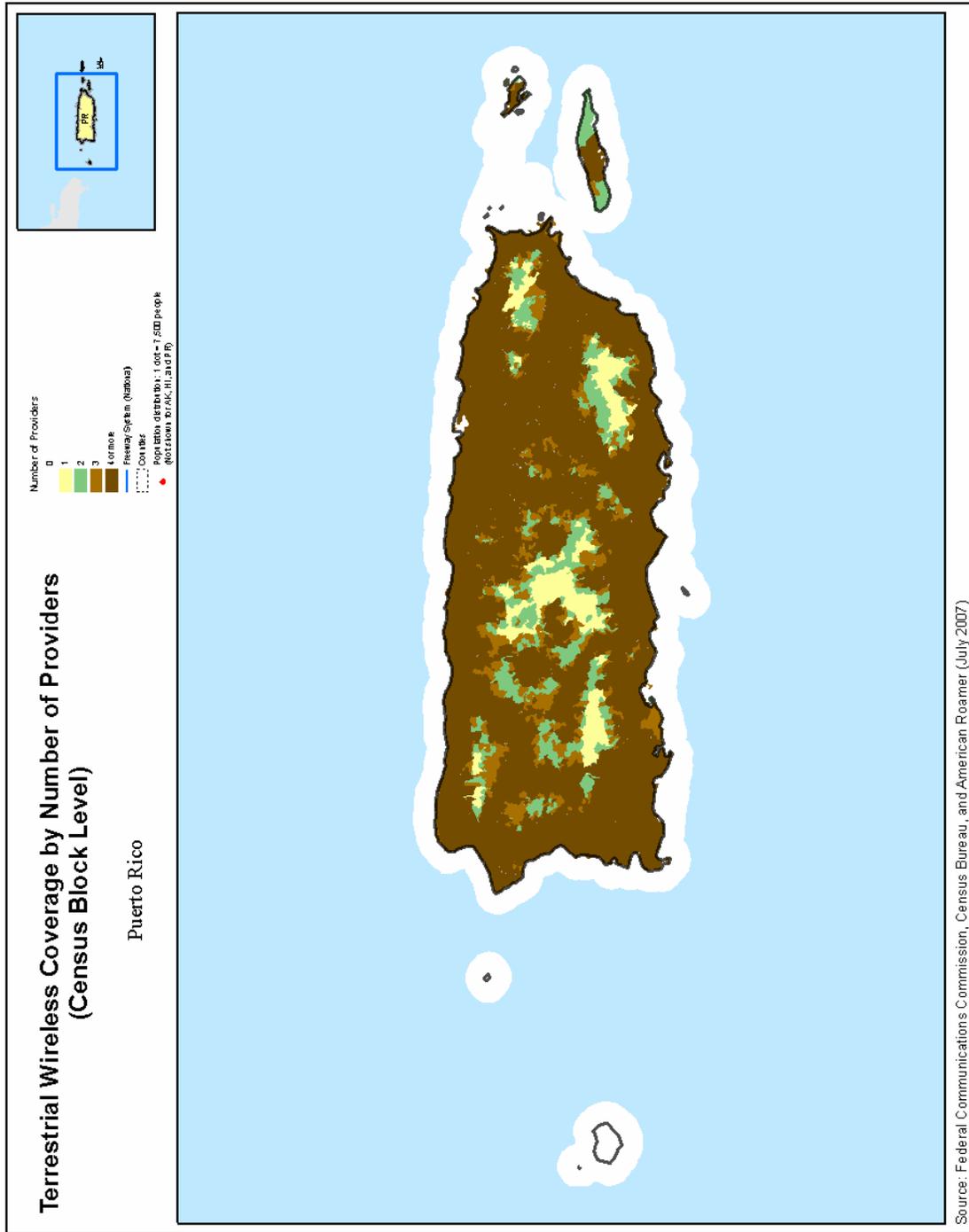
Map B-18: Wireless Coverage by Number of Providers By Region (14)



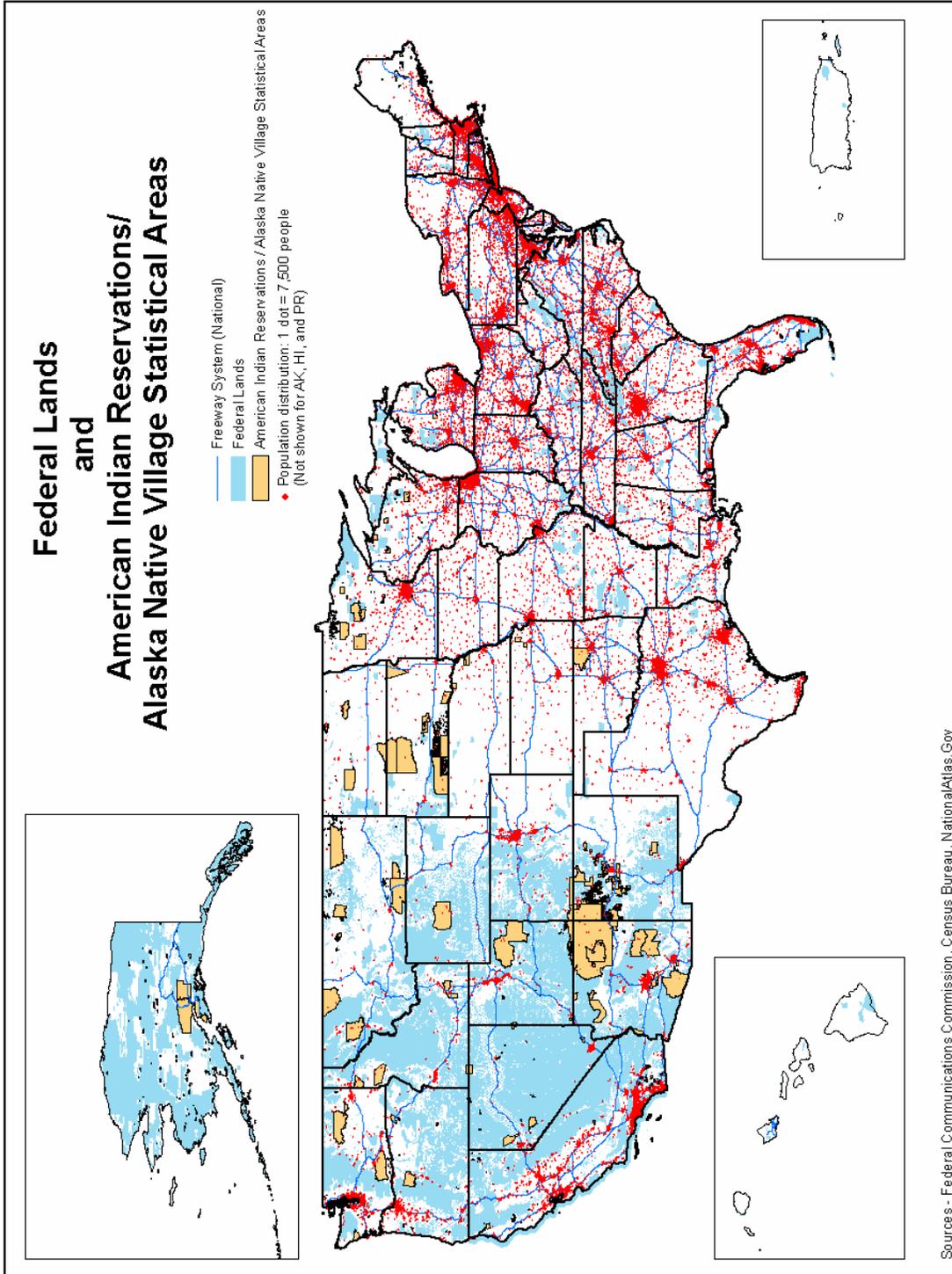
Map B-19: Wireless Coverage by Number of Providers By Region (15)



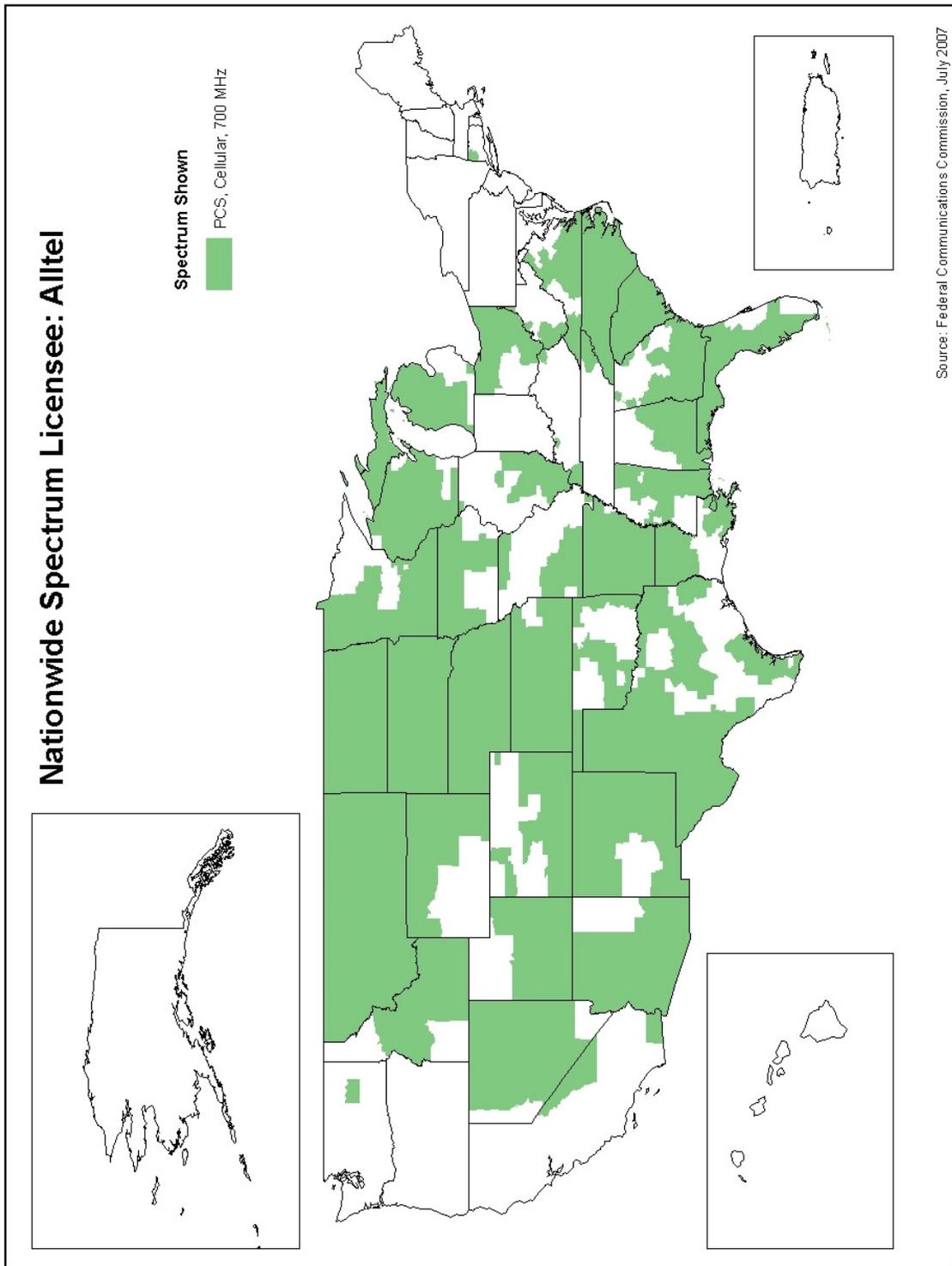
Map B-20: Wireless Coverage by Number of Providers By Region (16)



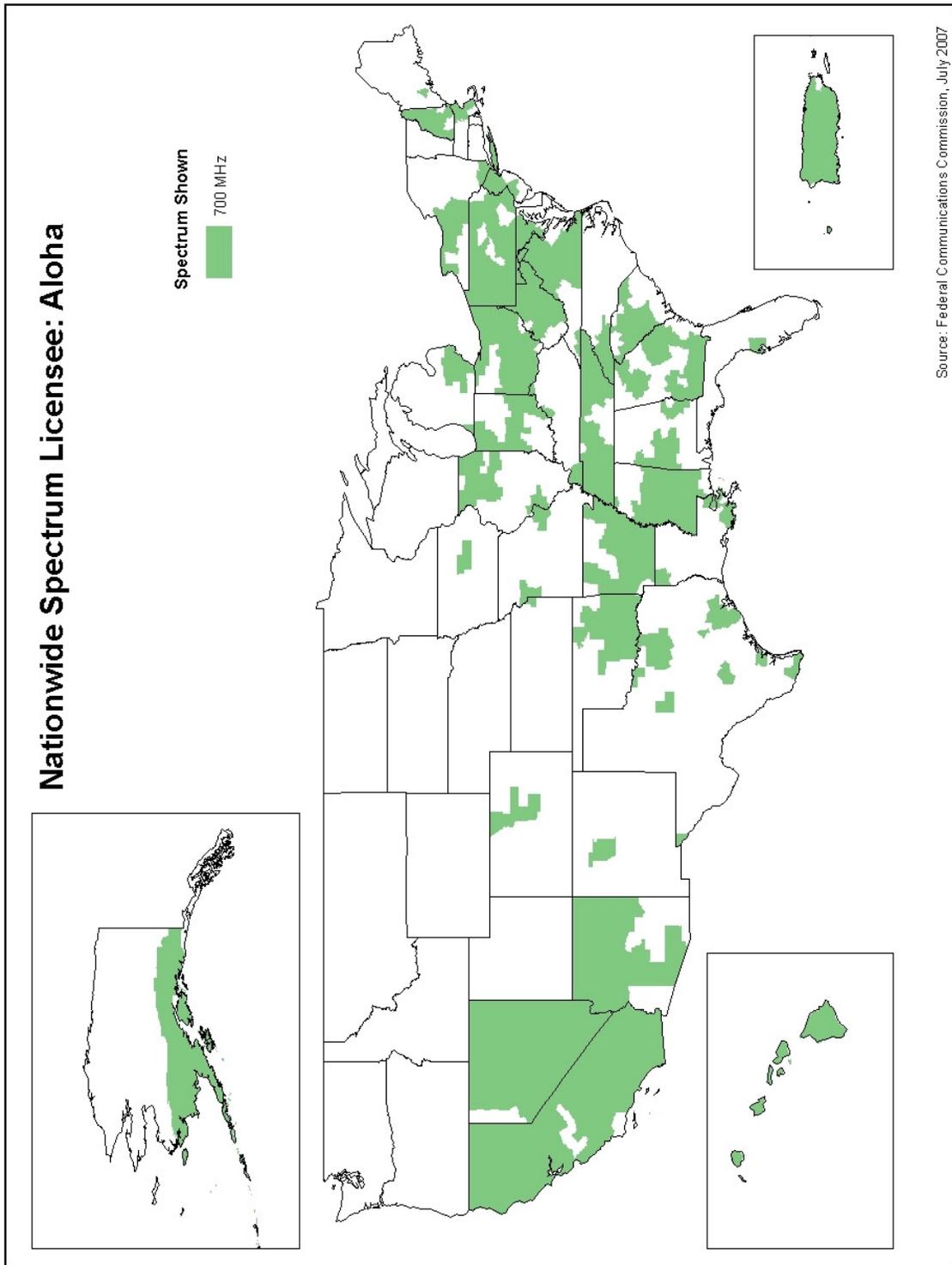
Map B-21: US Federal Lands



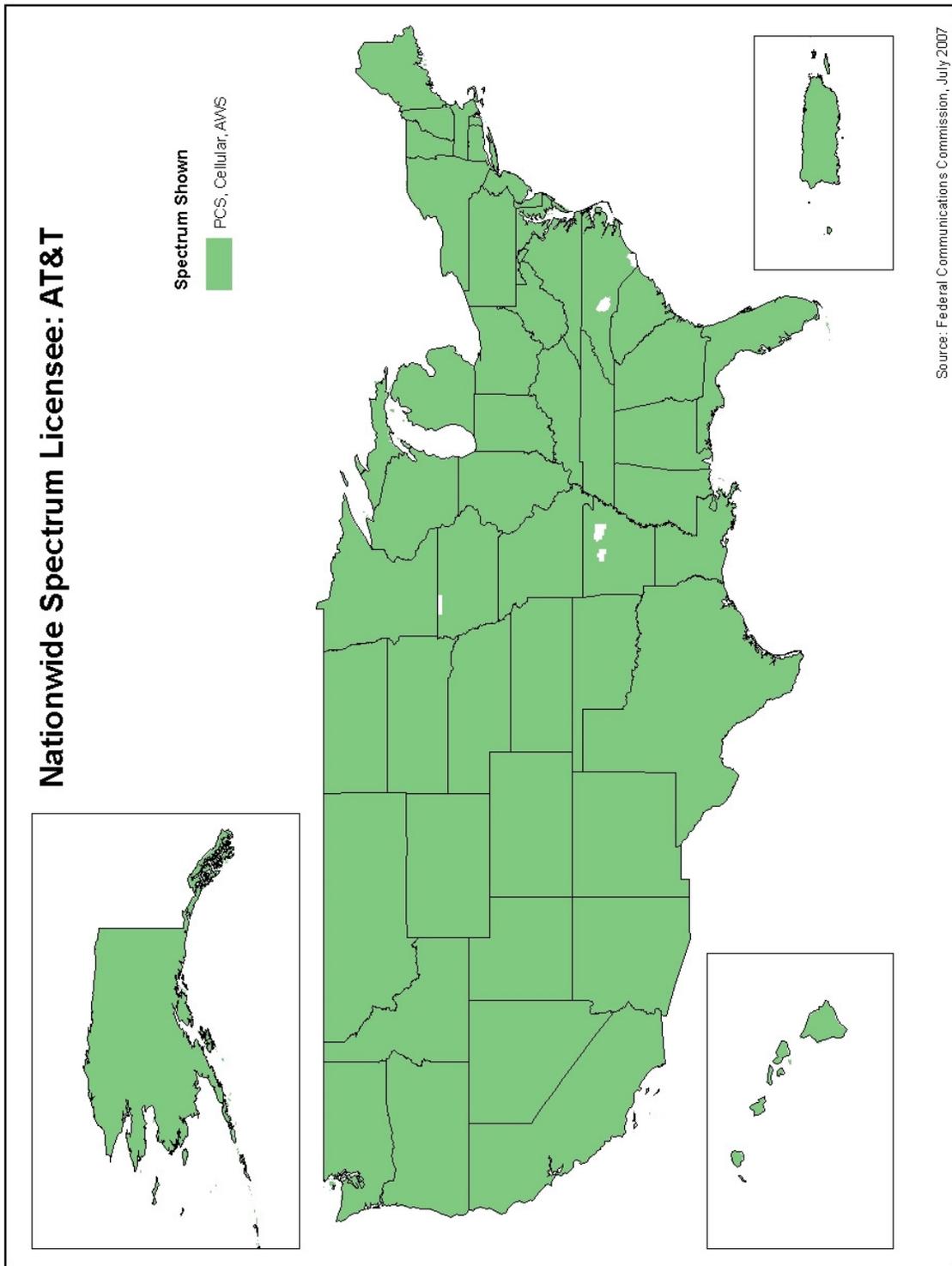
Map B-22: Nationwide Spectrum Licensee: Alltel



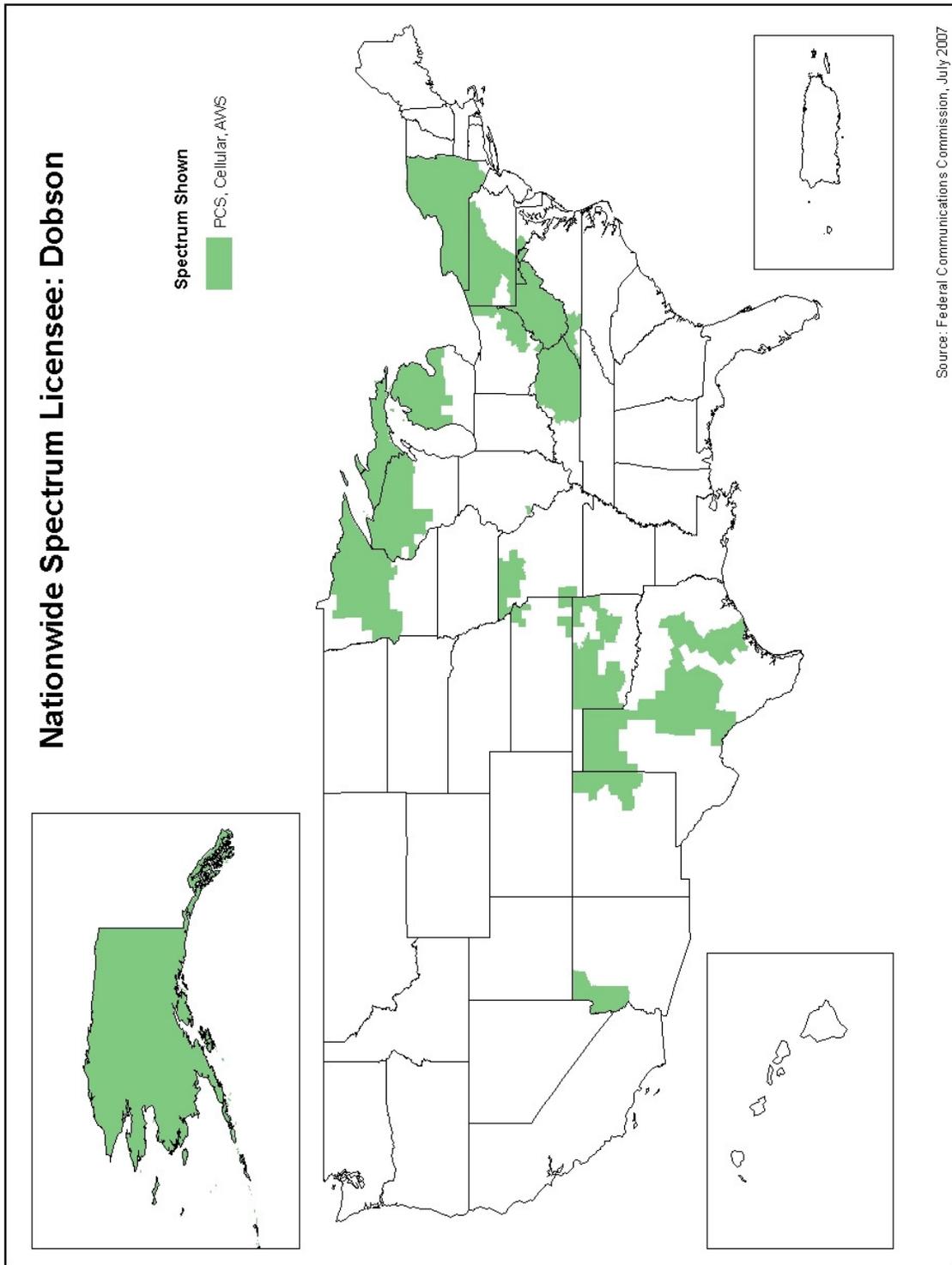
Map B-23: Nationwide Spectrum Licensee: Aloha



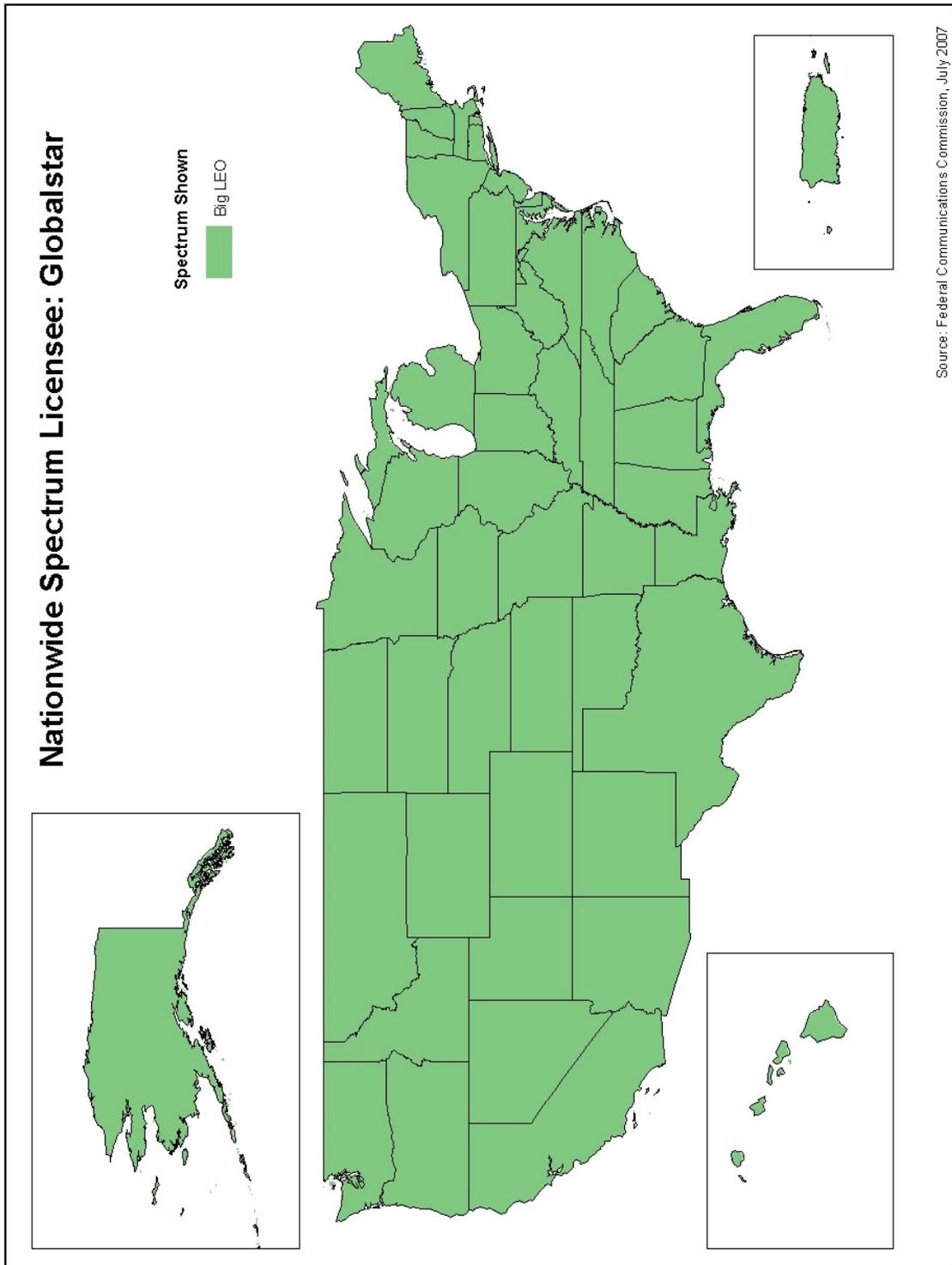
Map B-24: Nationwide Spectrum Licensee: AT&T



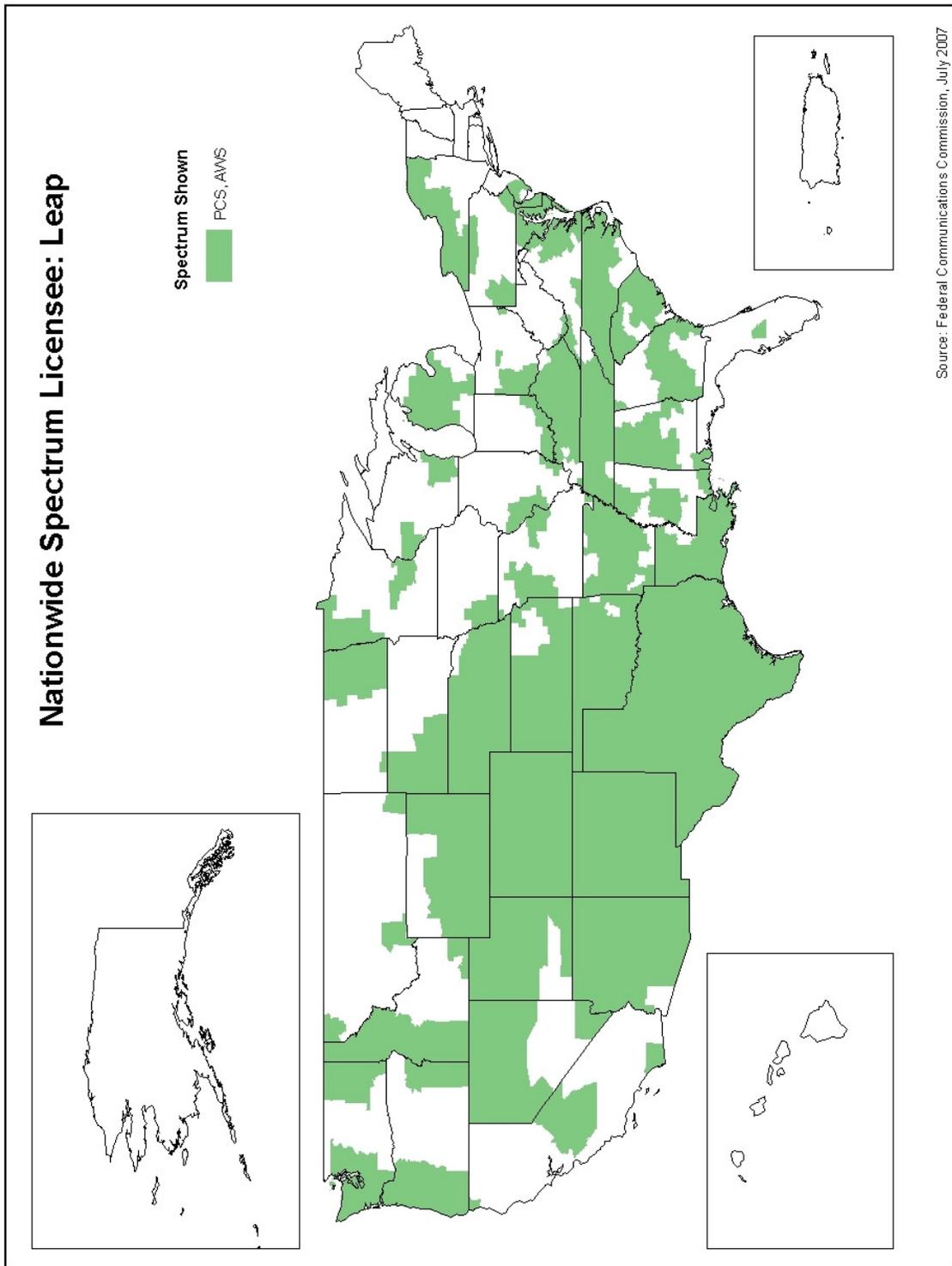
Map B-25: Nationwide Spectrum Licensee: Dobson



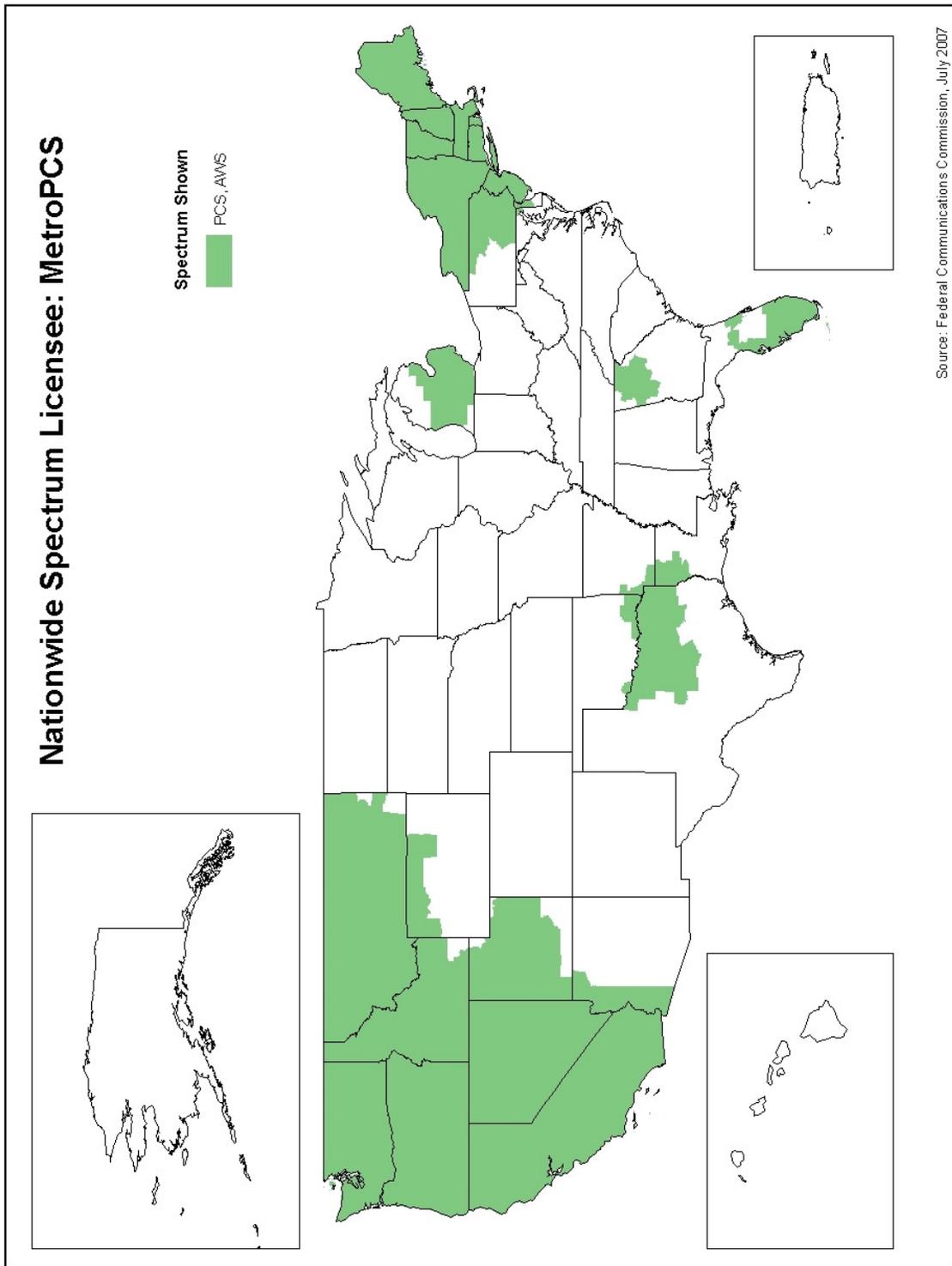
Map B-26: Nationwide Spectrum Licensee: Globalstar



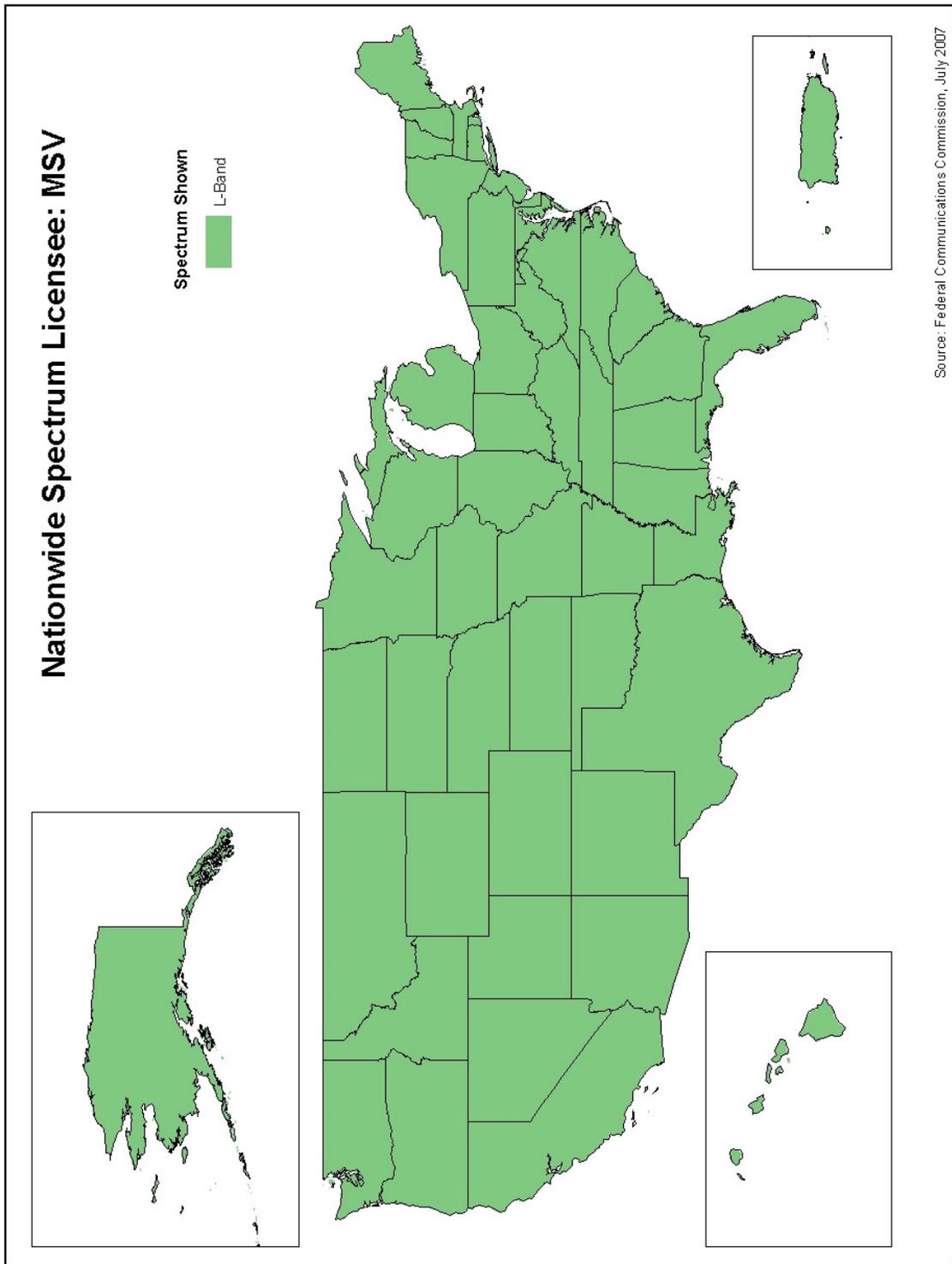
Map B-27: Nationwide Spectrum Licensee: Leap



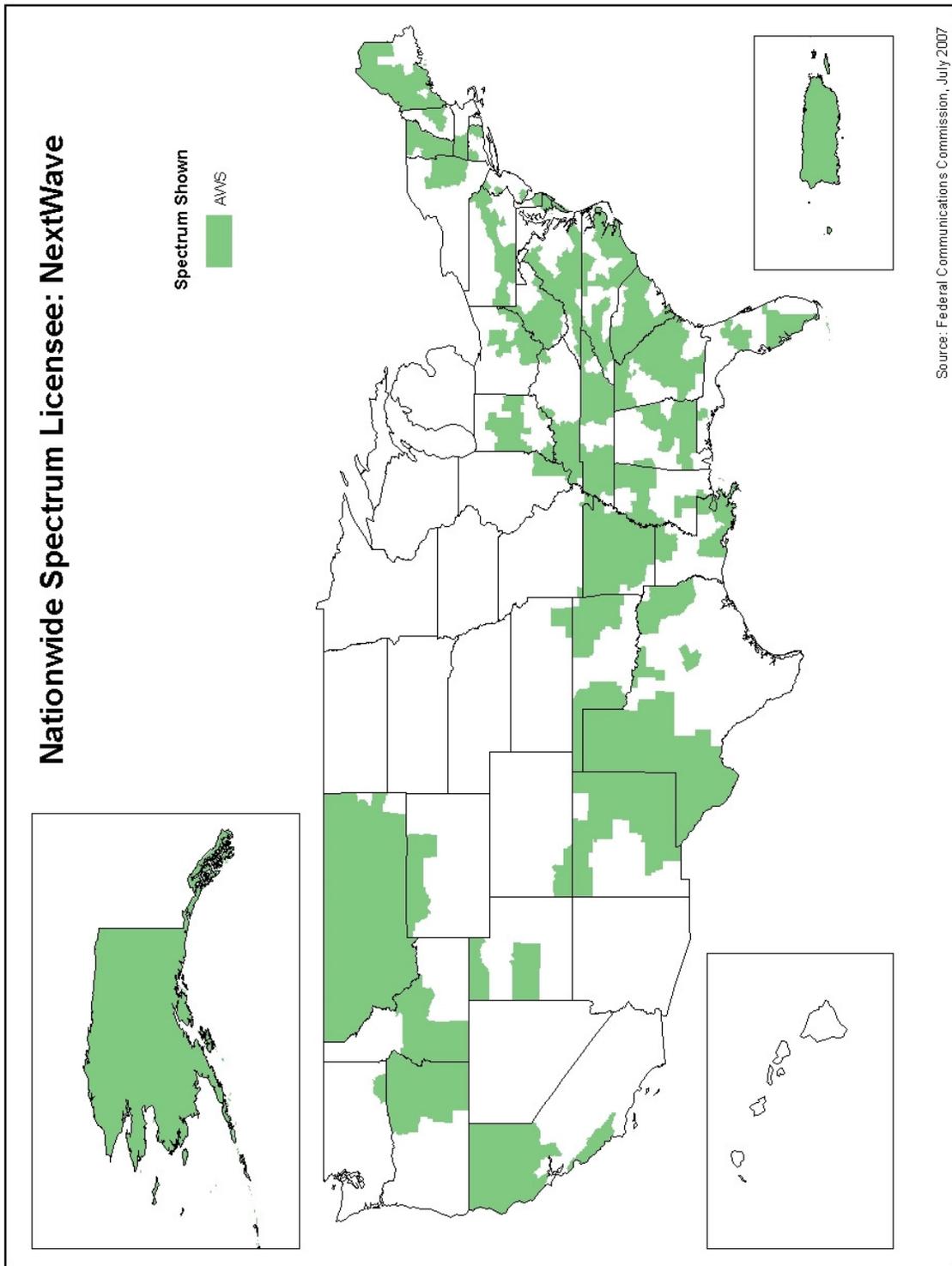
Map B-28: Nationwide Spectrum Licensee: MetroPCS



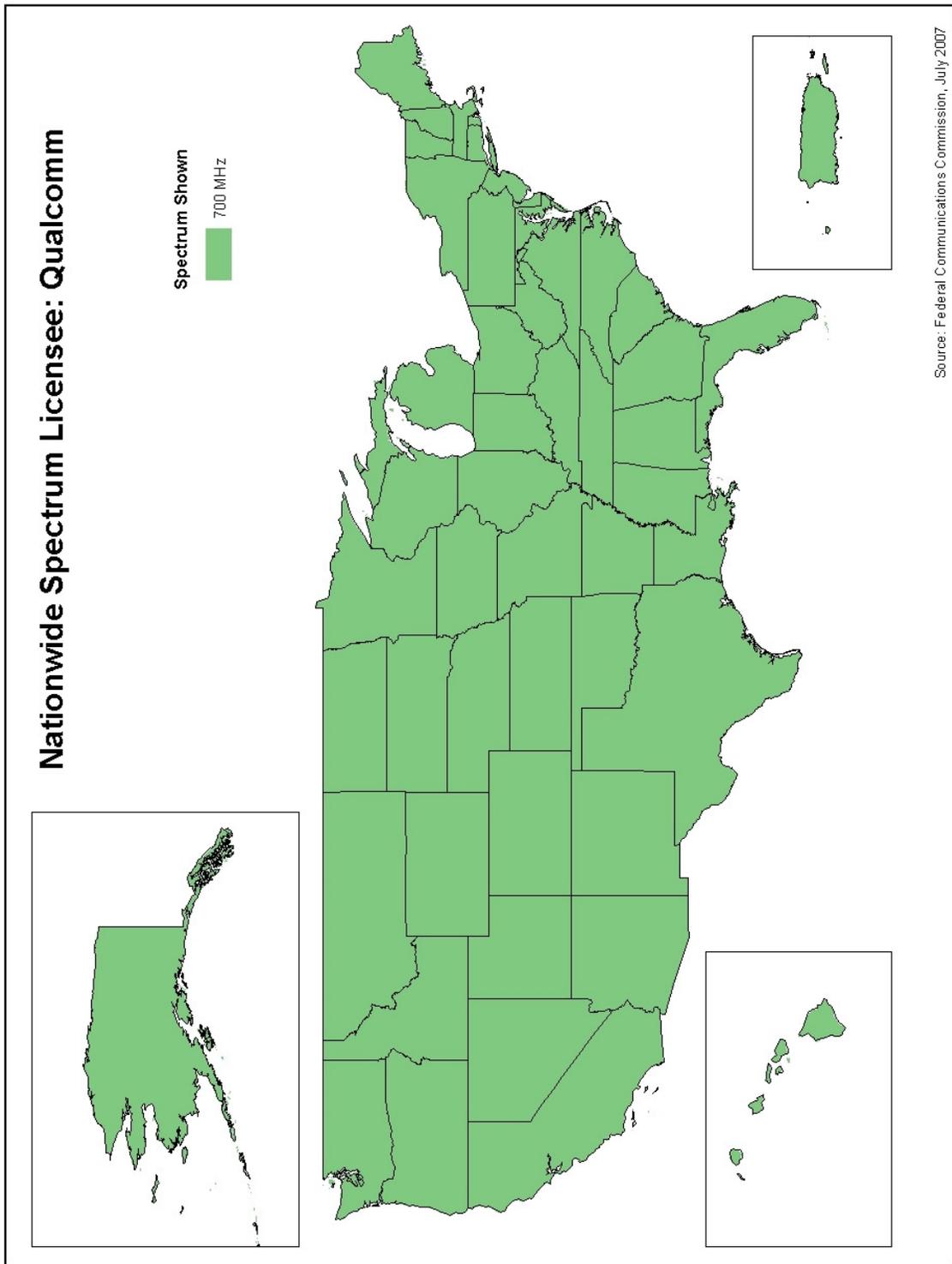
Map B-29: Nationwide Spectrum Licensee: MSV



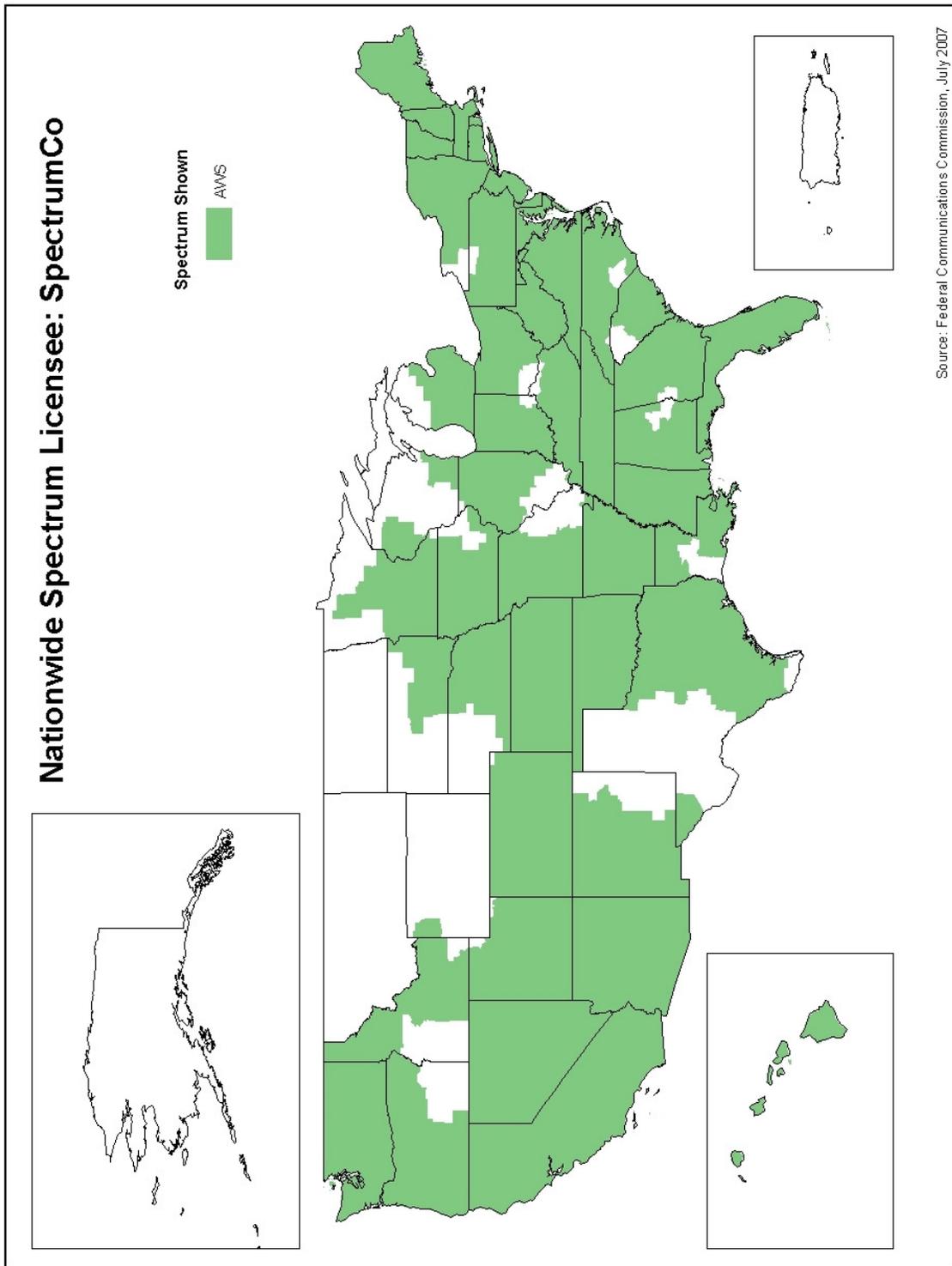
Map B-30: Nationwide Spectrum Licensee: NextWave



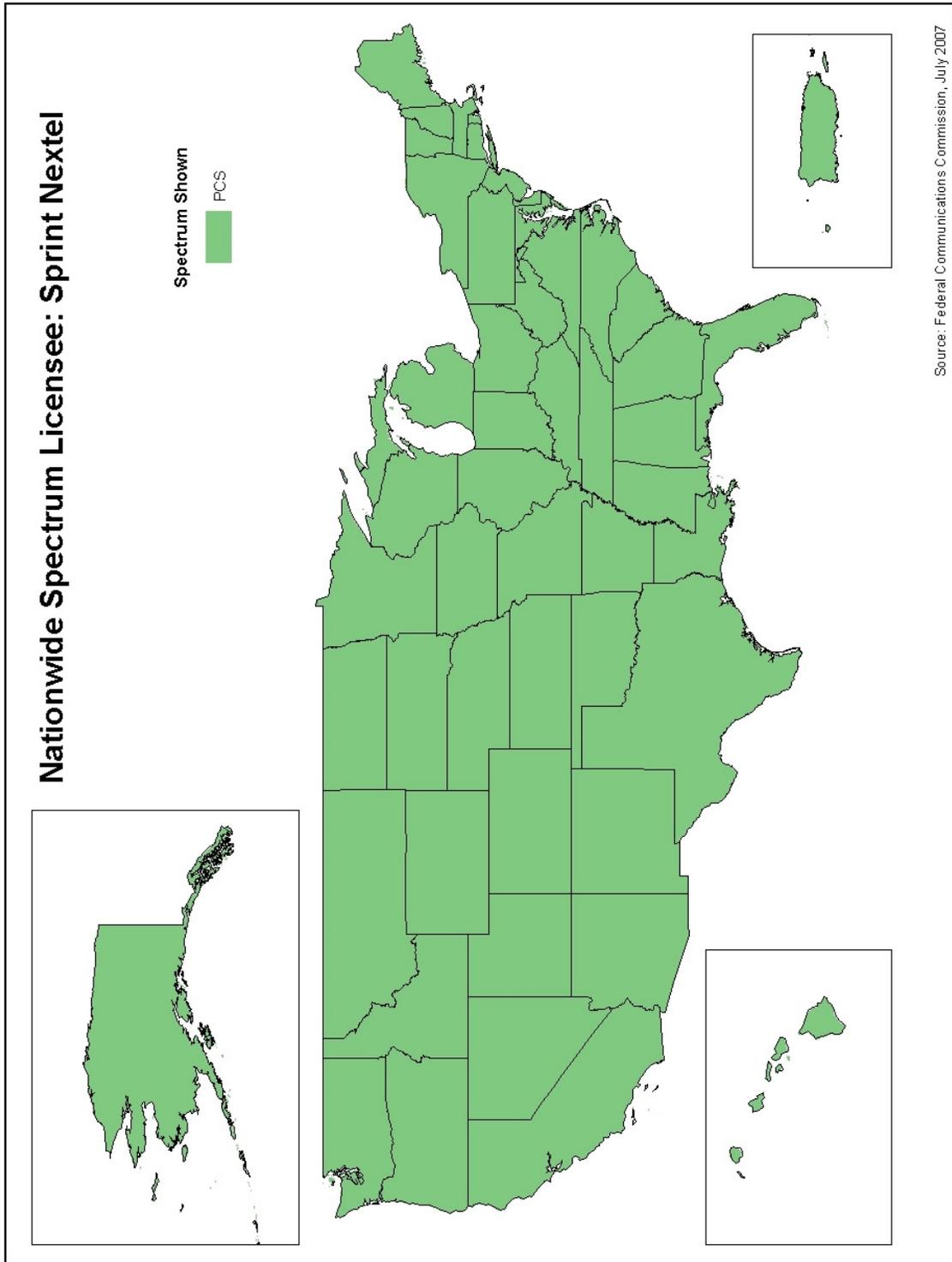
Map B-31: Nationwide Spectrum Licensee: Qualcomm



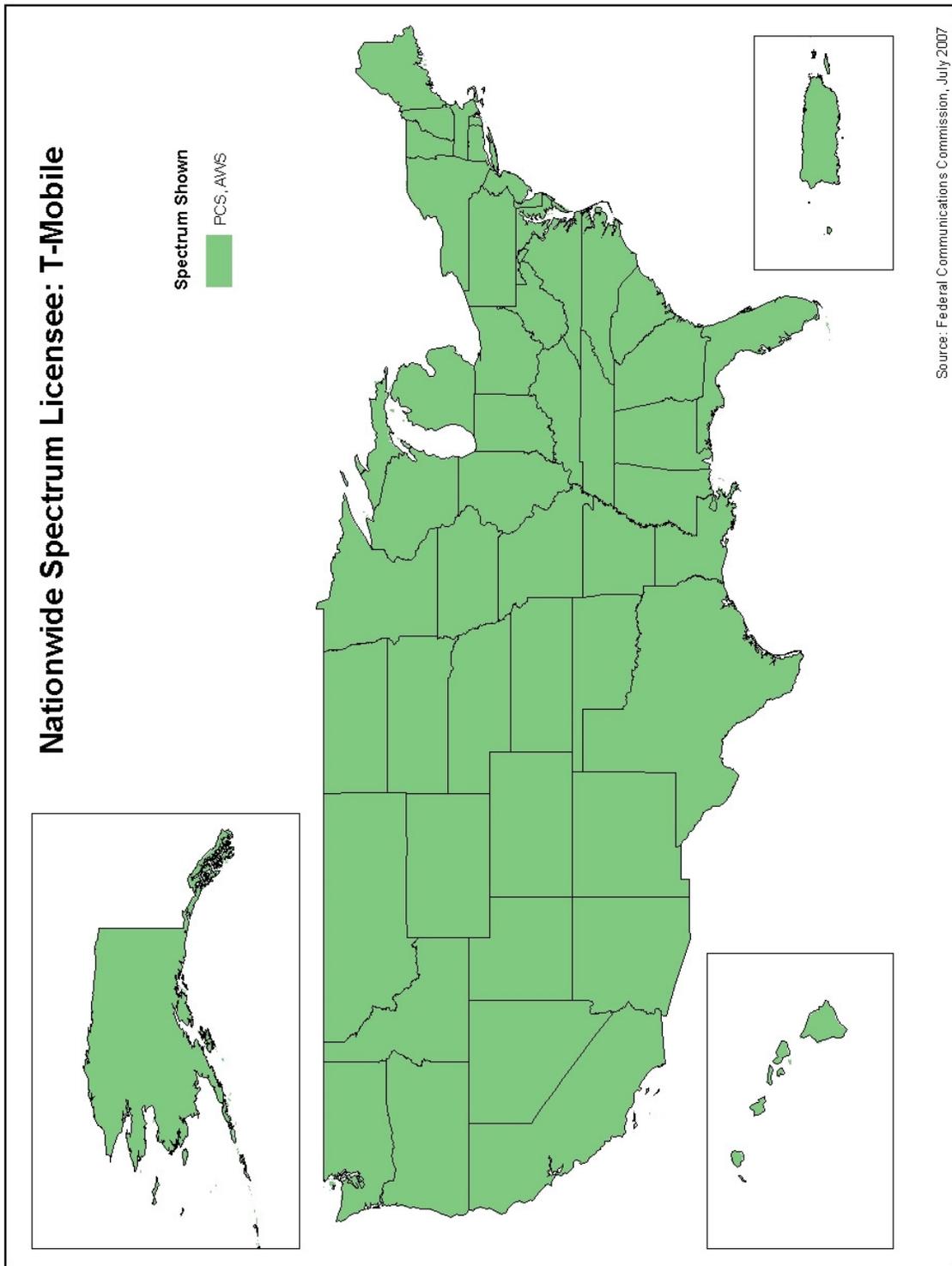
Map B-32: Nationwide Spectrum Licensee: SpectrumCo



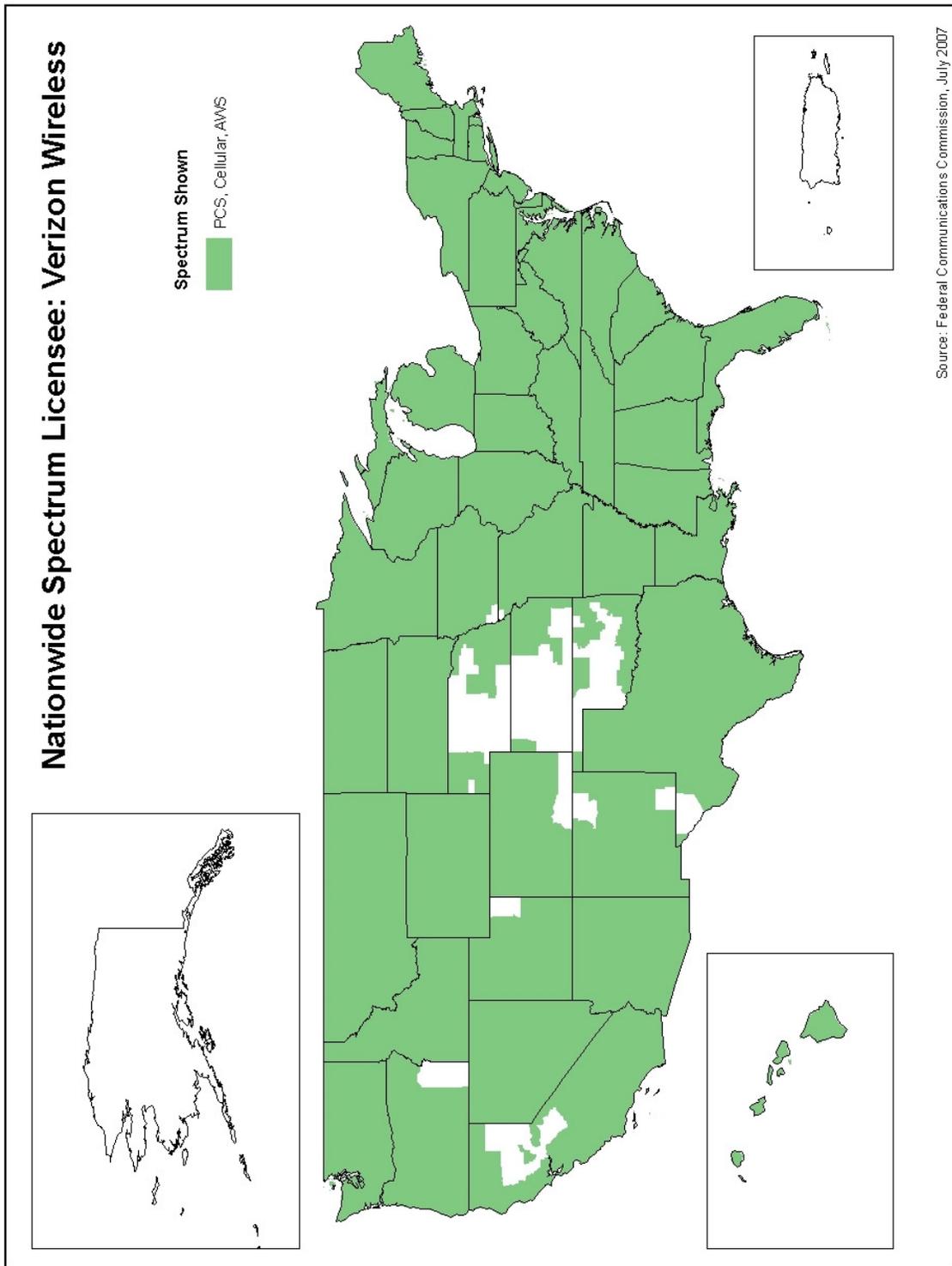
Map B-33: Nationwide Spectrum Licensee: Sprint Nextel



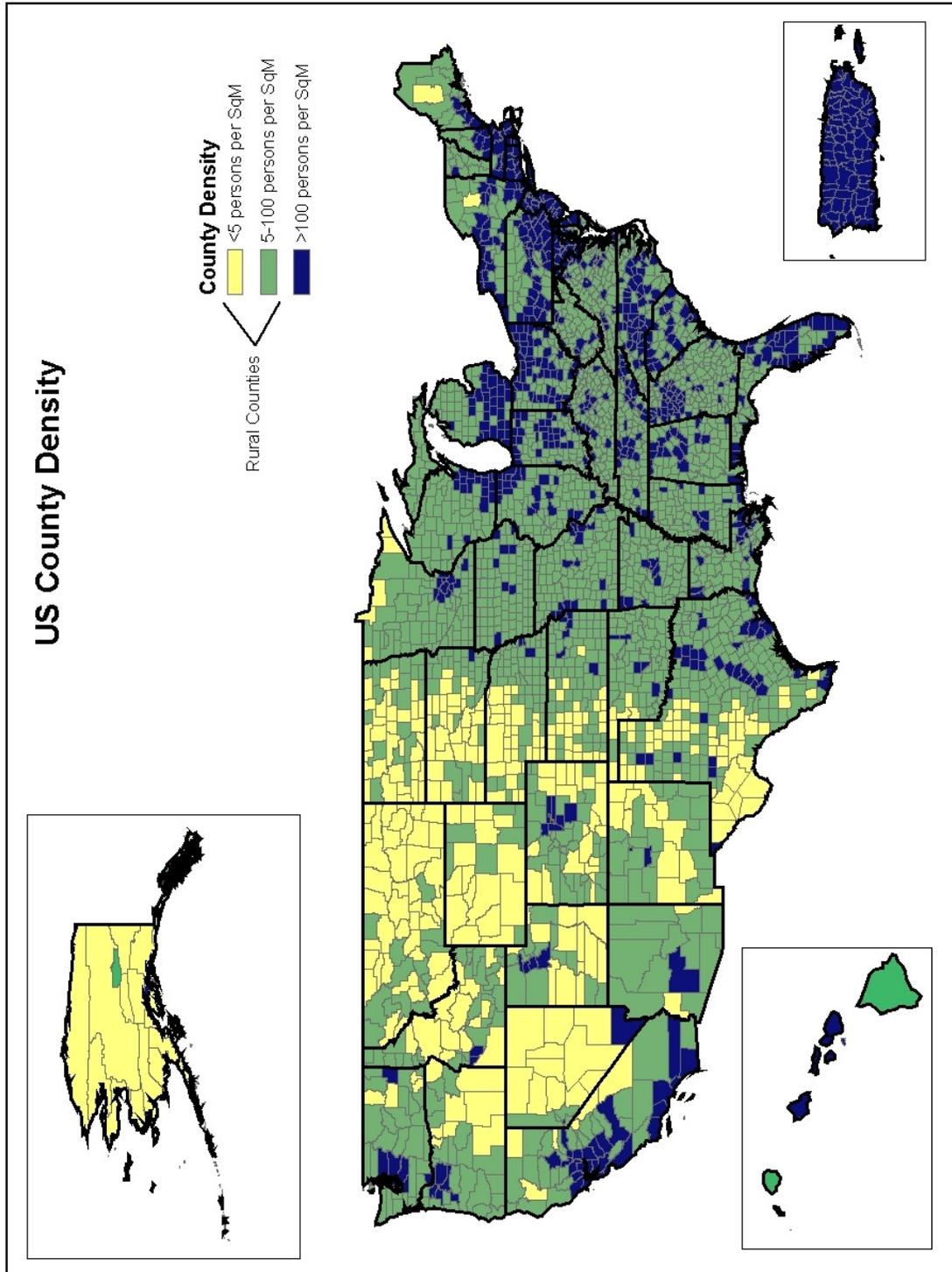
Map B-34: Nationwide Spectrum Licensee: T-Mobile



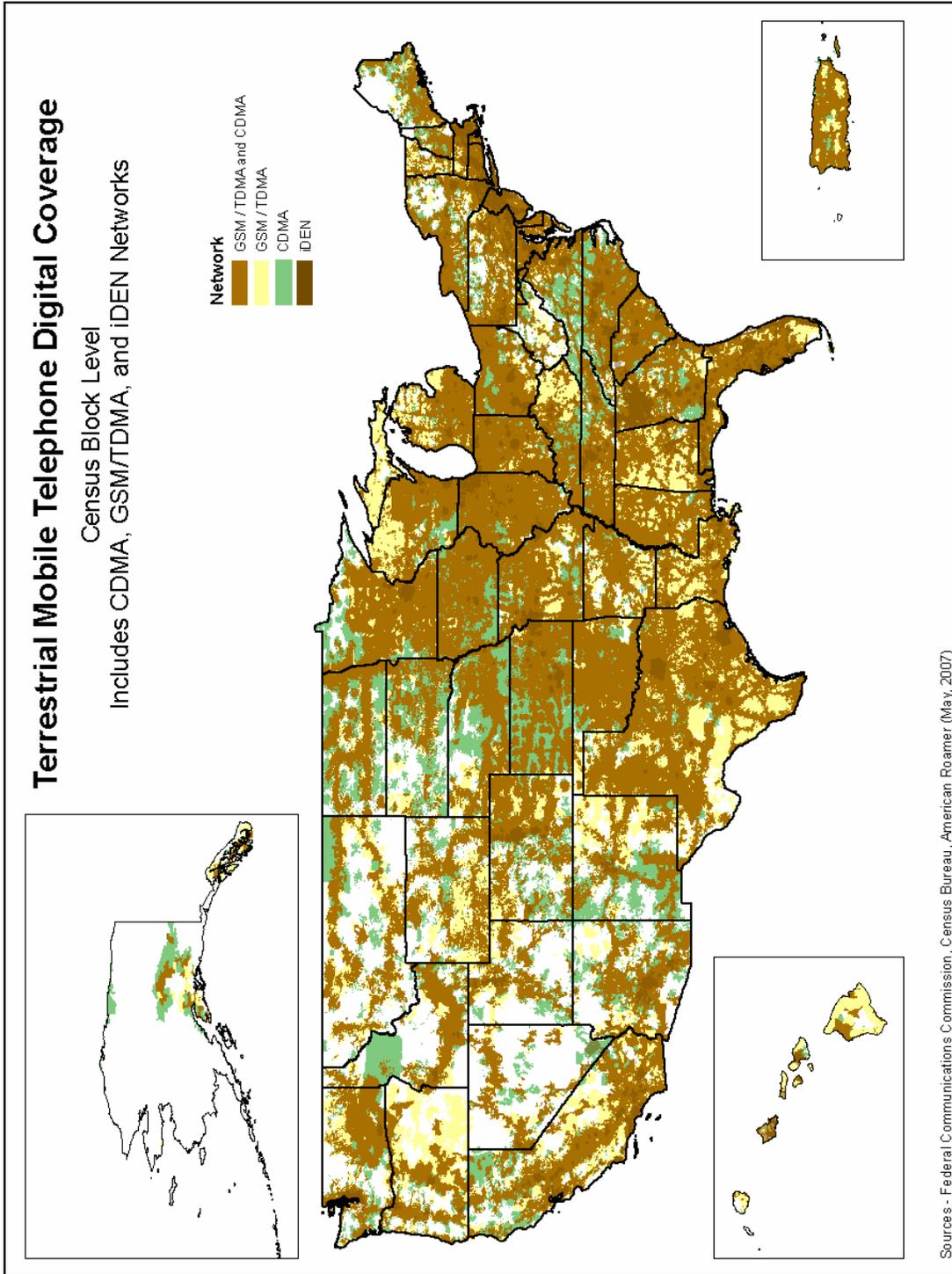
Map B-35: Nationwide Spectrum Licensee: Verizon Wireless



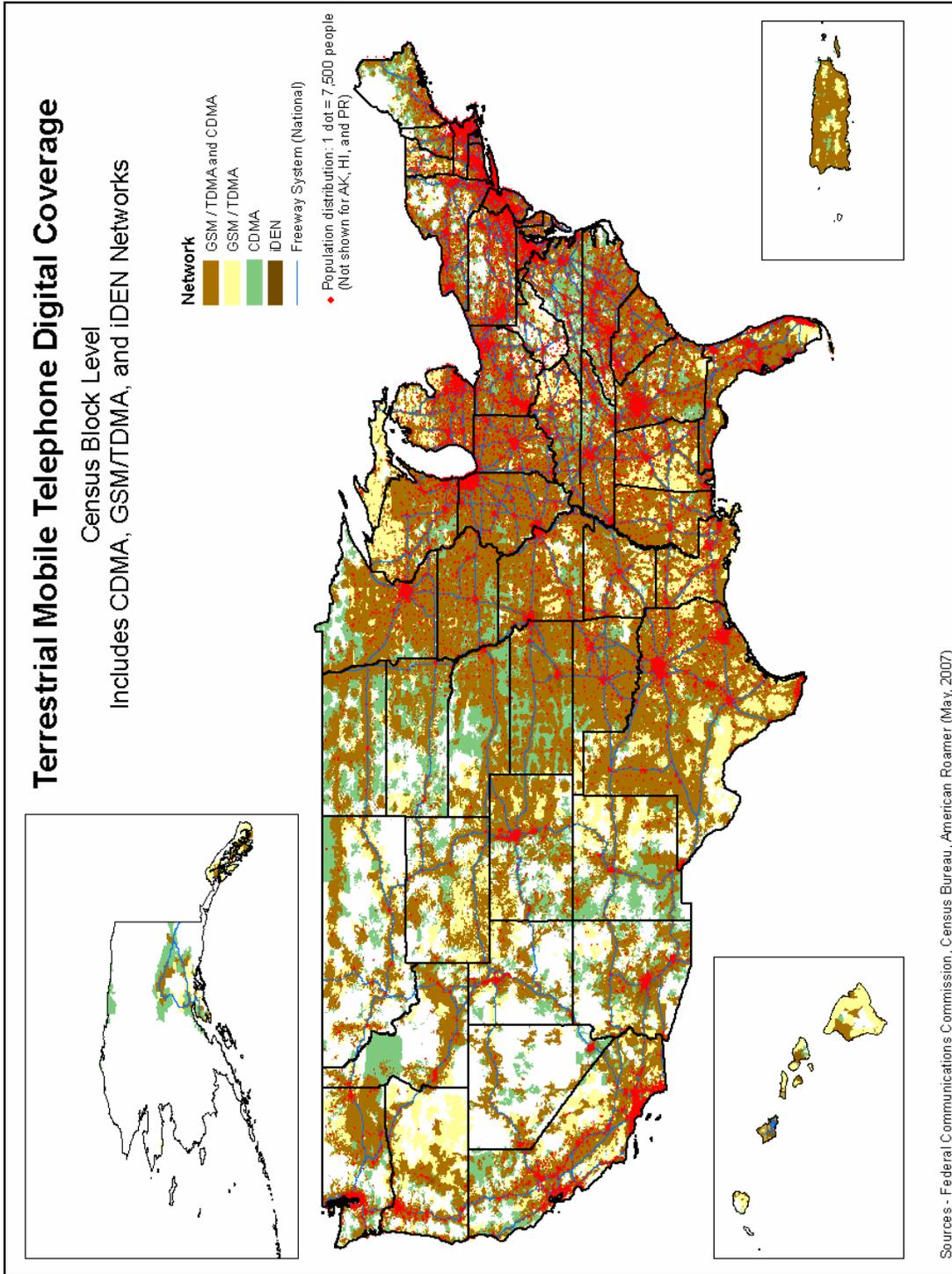
Map B-36: US County Density



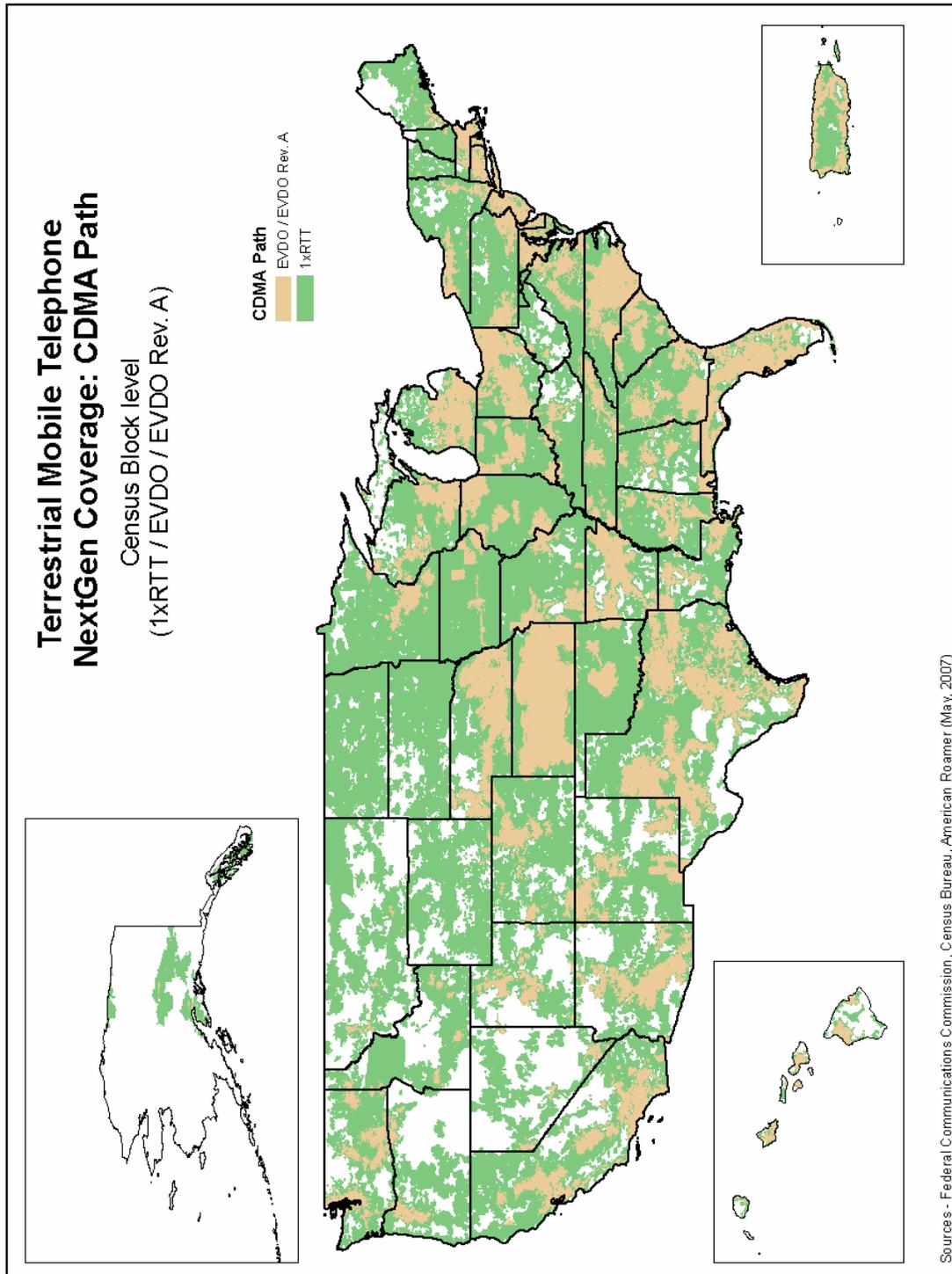
Map B-37: Mobile Telephone Digital Coverage



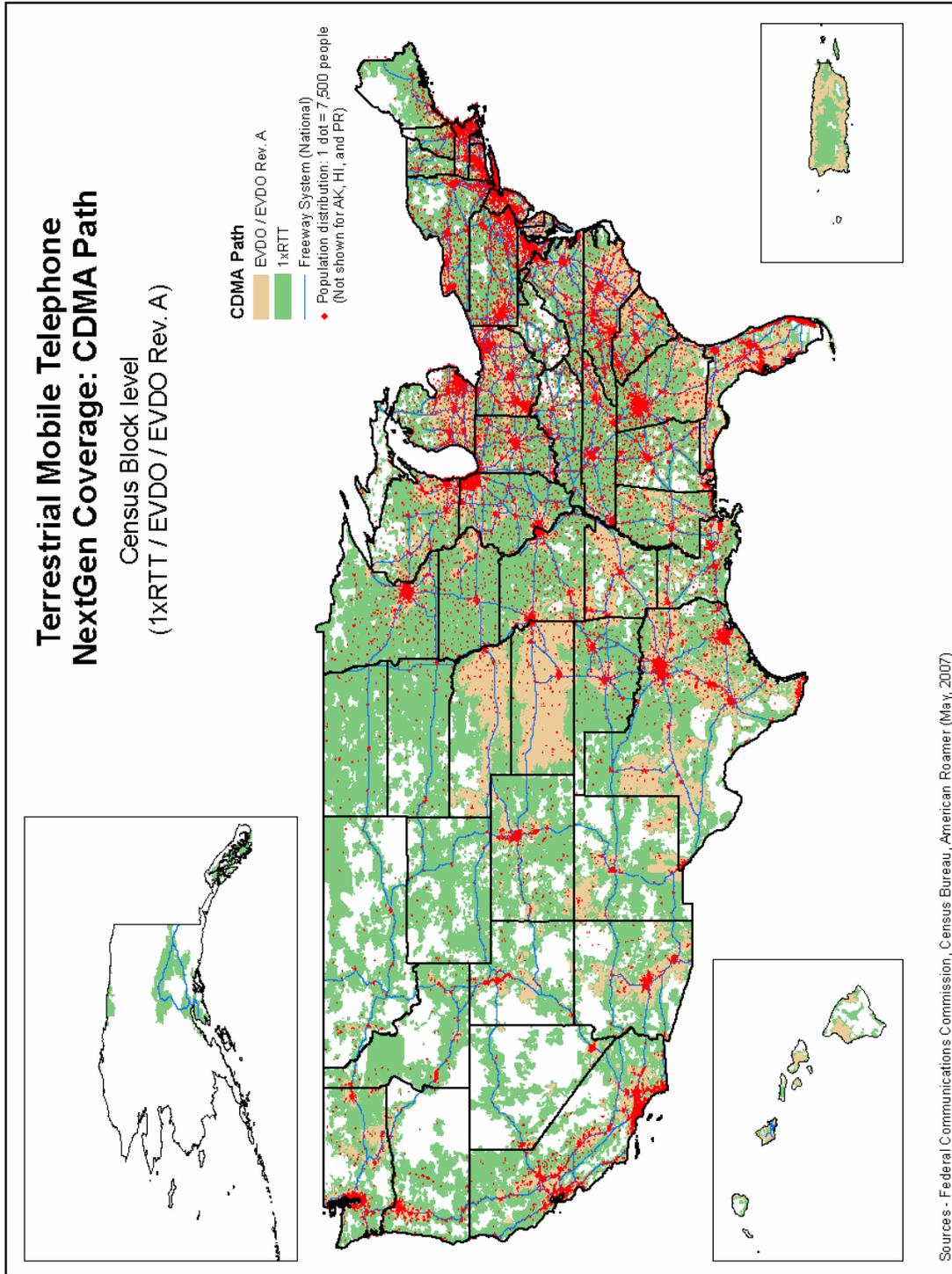
Map B-38: Mobile Telephone Digital Coverage (2)



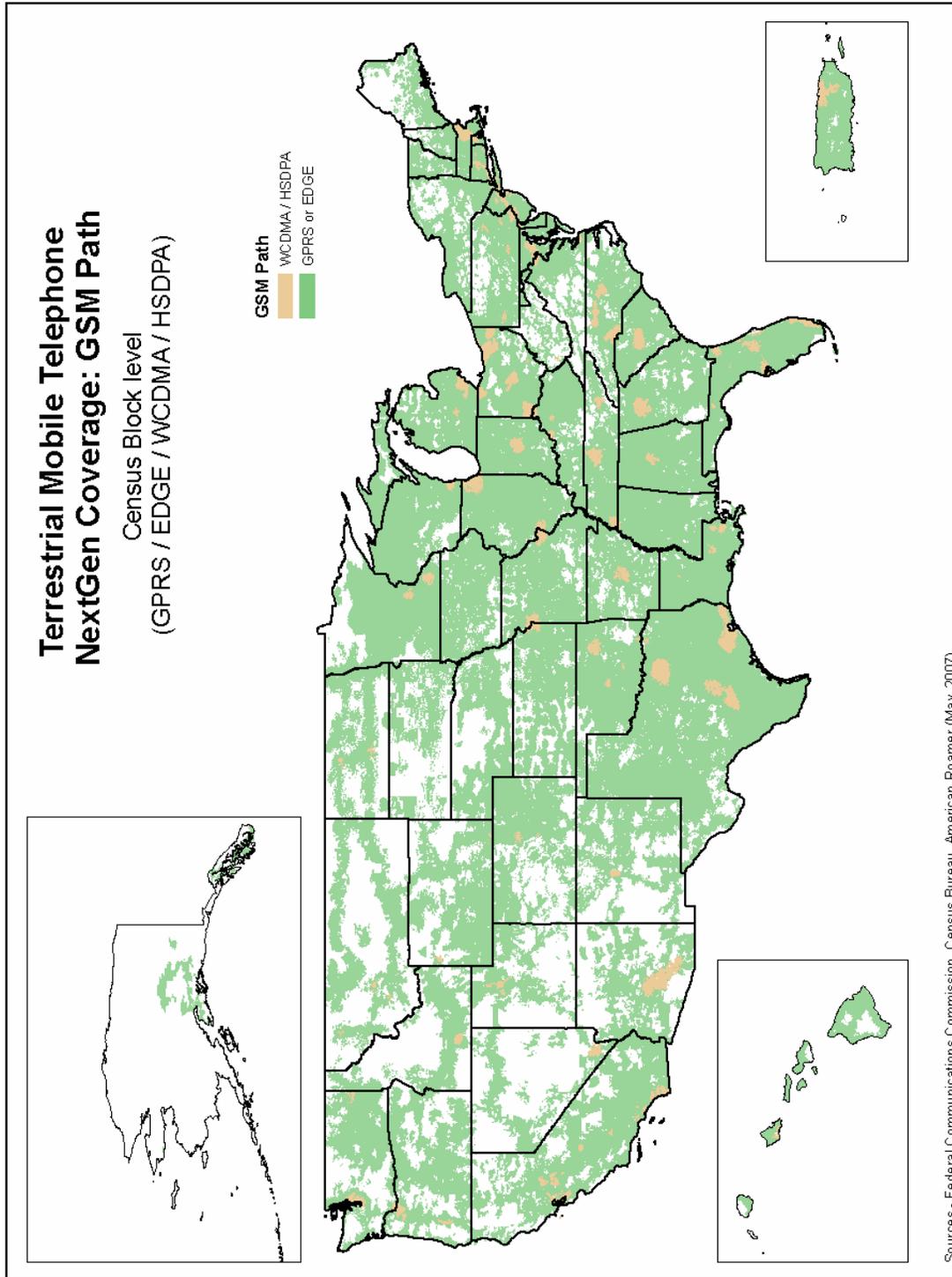
Map B-39: Mobile Telephone NextGen Coverage: CDMA Path



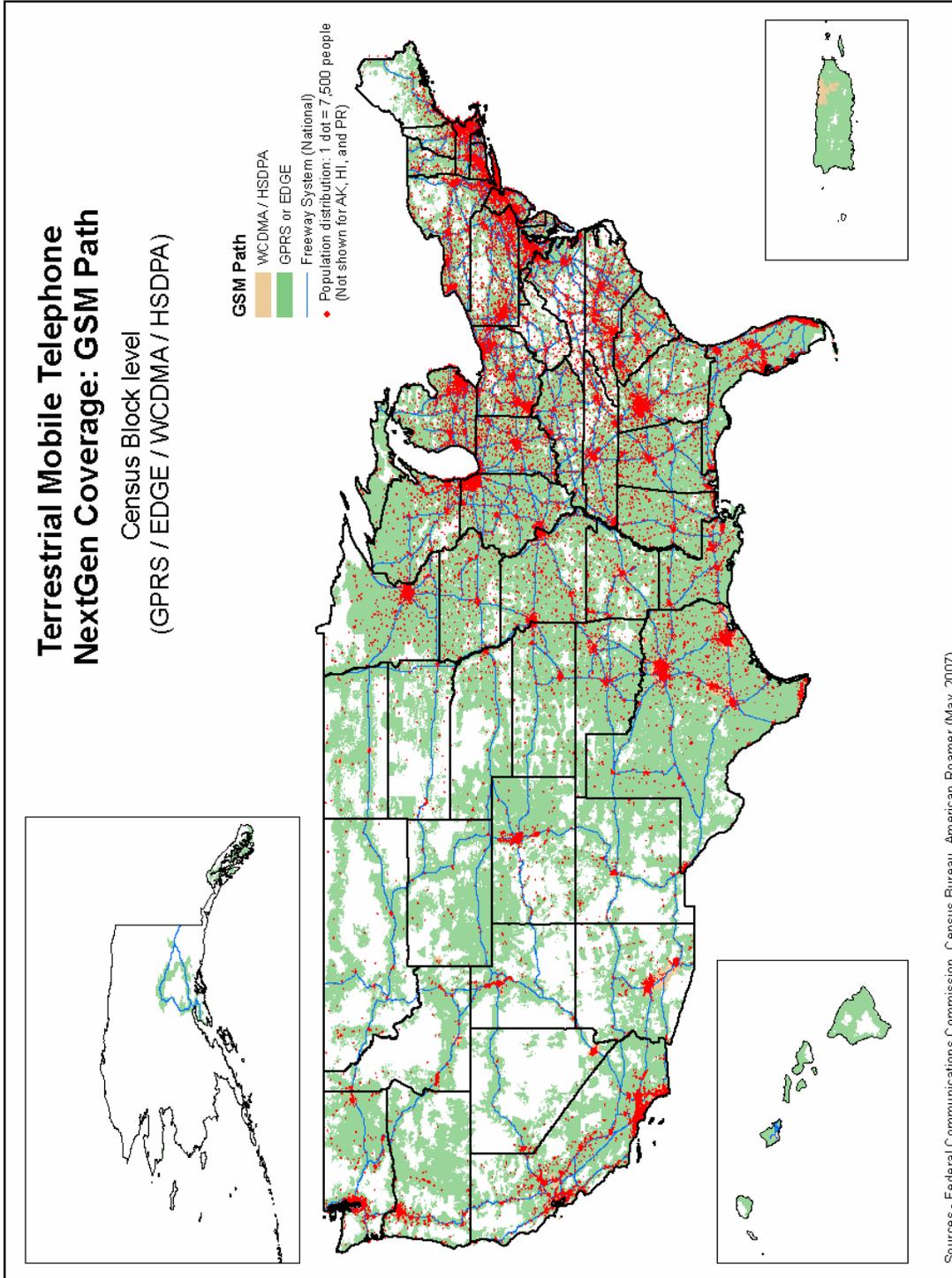
Map B-40: Mobile Telephone NextGen Coverage: CDMA Path (2)



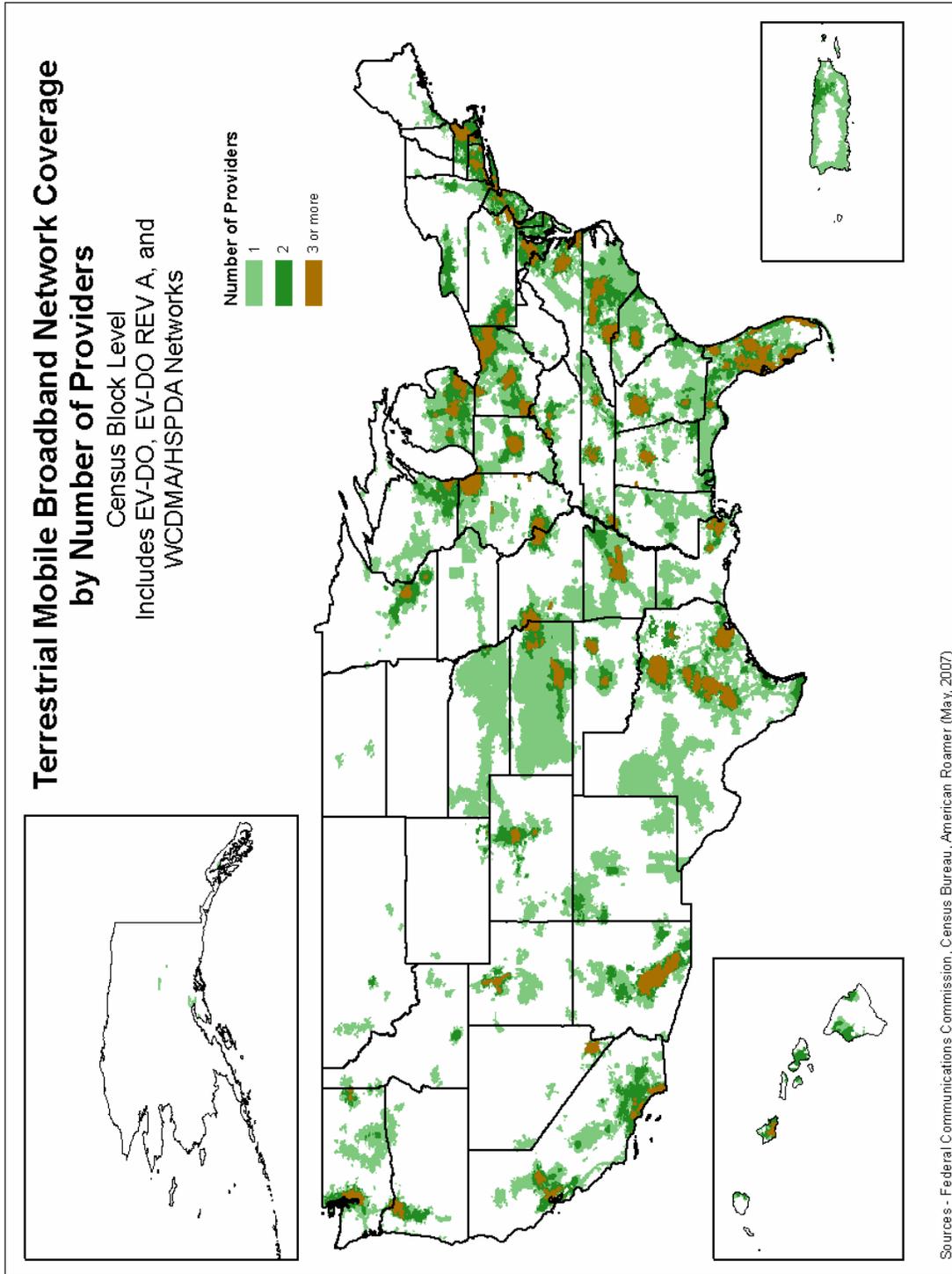
Map B-41: Mobile Telephone NextGen Coverage: GSM Path



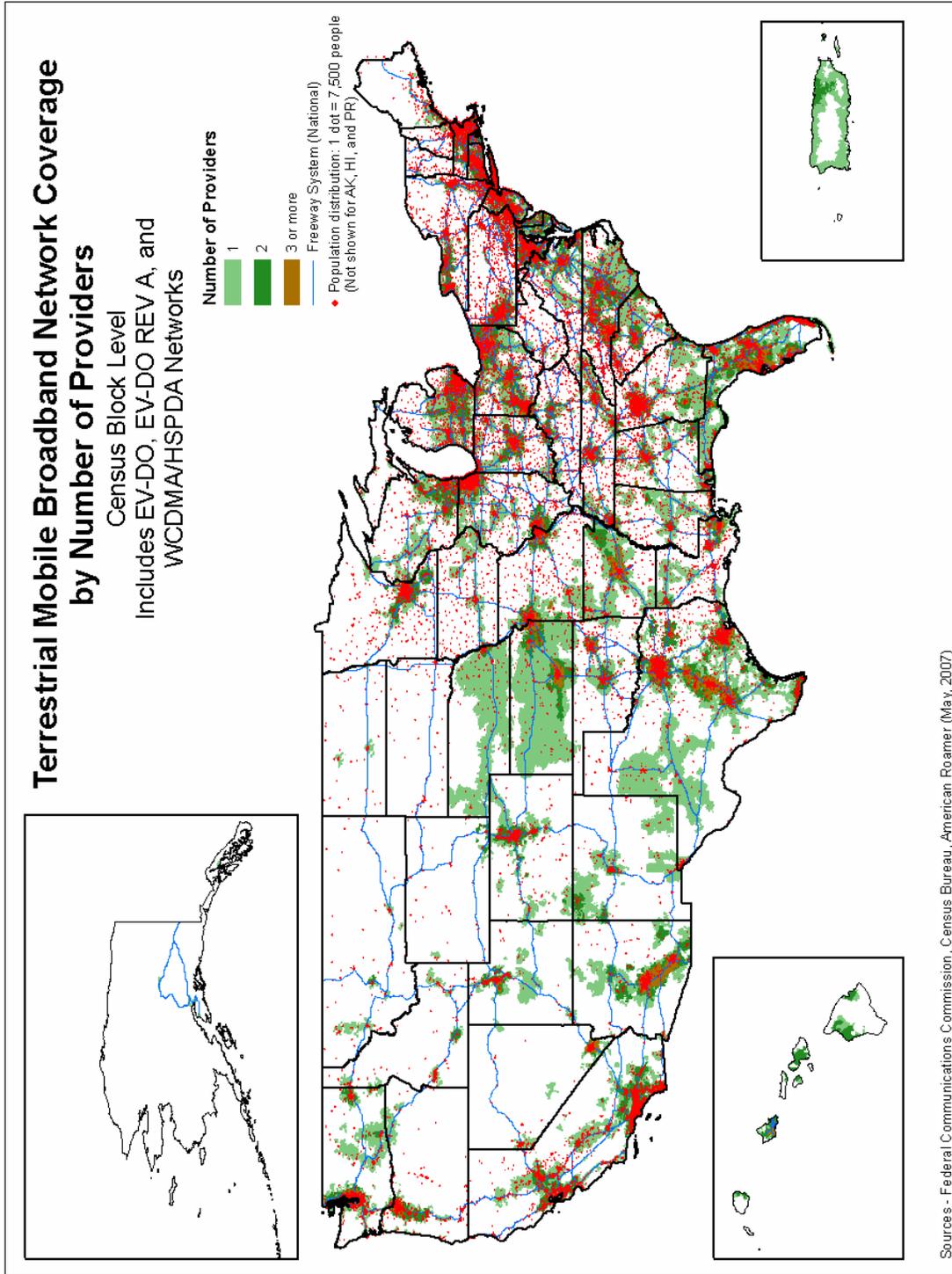
Map B-42: Mobile Telephone NextGen Coverage: GSM Path (2)



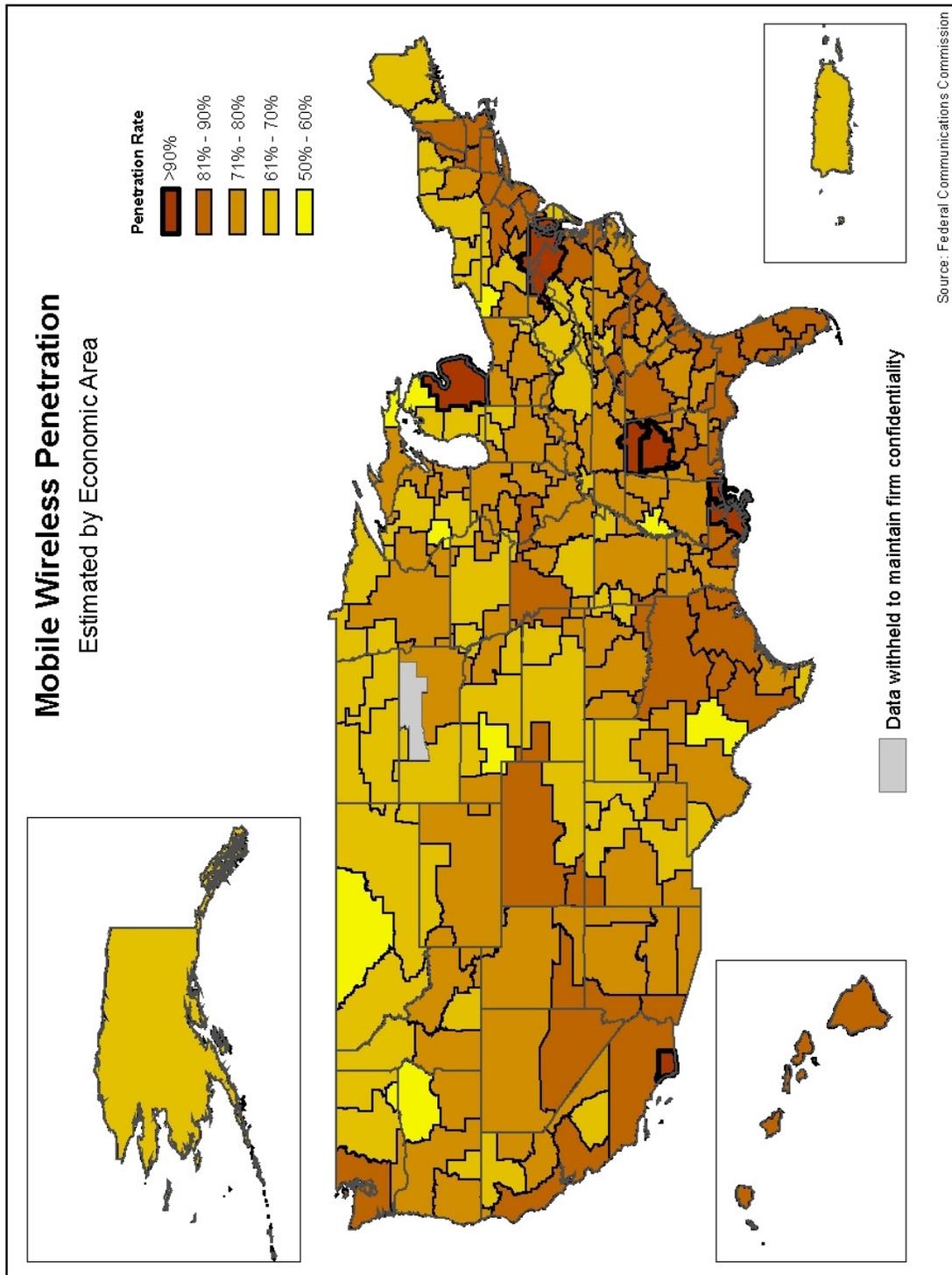
Map B-43: Mobile Broadband Nextwork Coverage



Map B-44: Mobile Broadband Nextwork Coverage (2)



Map B-45: Mobile Wireless Penetration

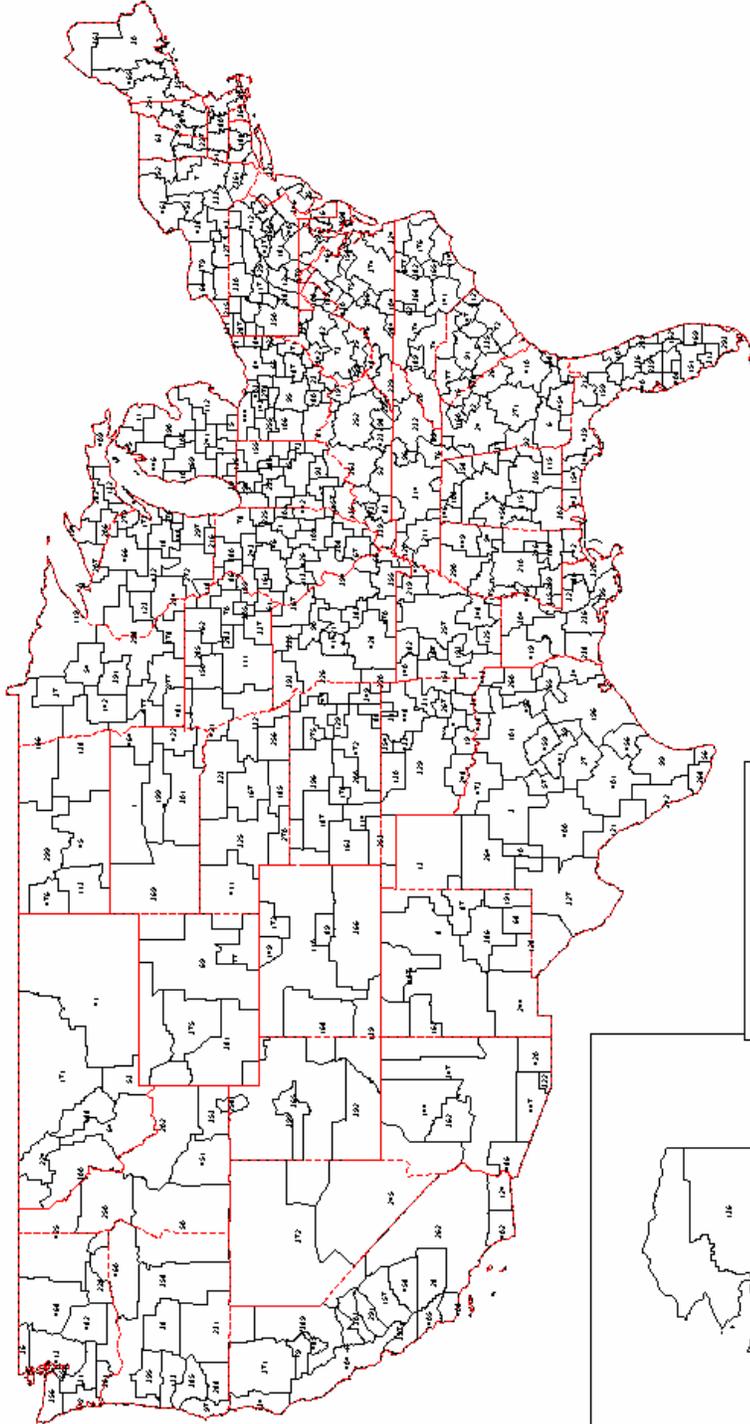


Geographic Licensing Schemes

Geographic Licensing Schemes	Number of Market Areas	Note
Basic Trading Areas (BTAs)	493	BTAs make up MTAs
Major Trading Areas (MTAs)	51	
Cellular Market Areas (CMAs)	734	Also known as MSAs and RSAs
Economic Areas (EAs)	175	
Regional Economic Area Groupings (REAGS)	12	

Map B-46

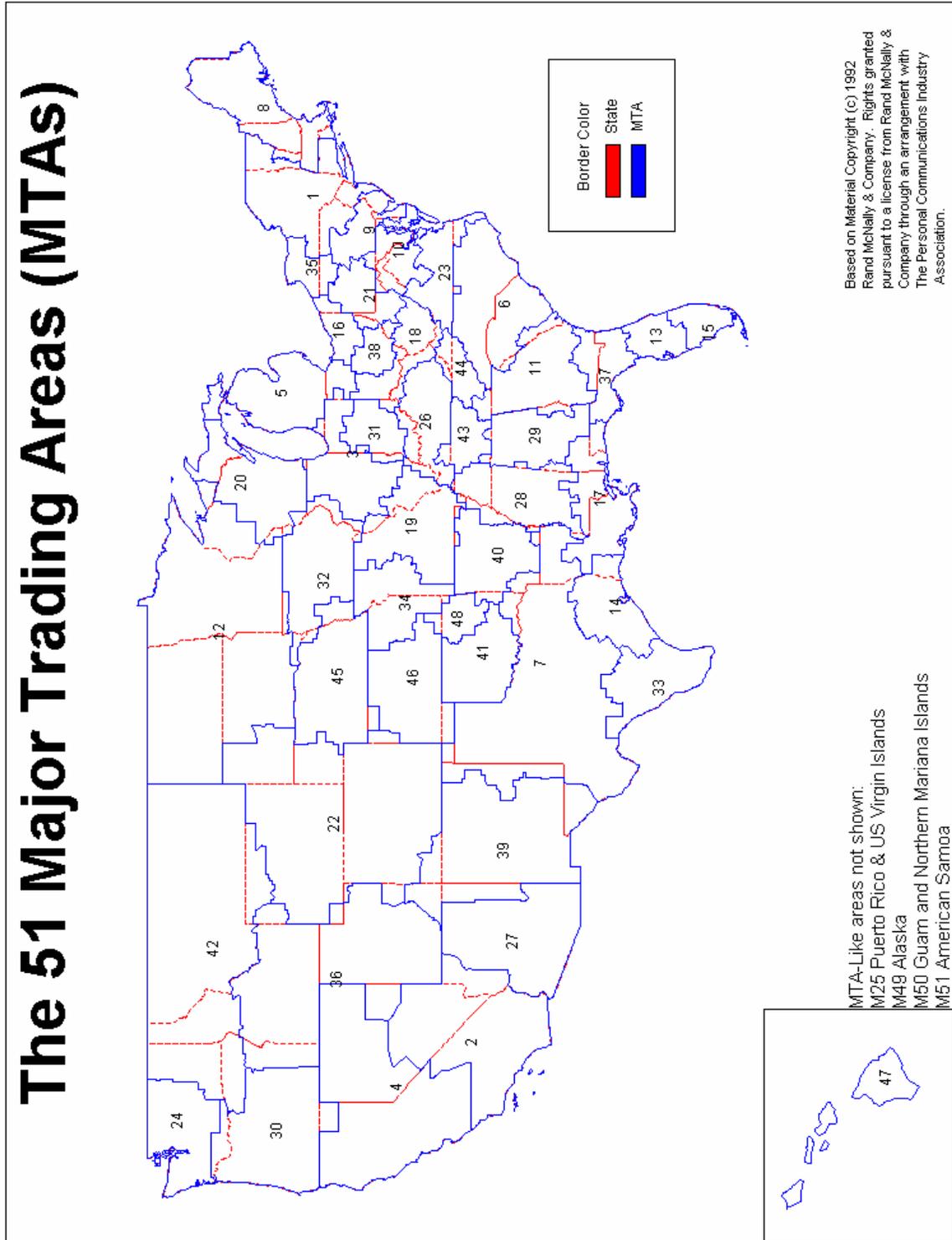
The 493 Basic Trading Areas (BTAs)



- BTA-Like areas not shown:
B488 San Juan, PR
B489 Mayaguez, PR
B480 Guam
B491 US Virgin Islands
B492 American Samoa
B493 Northern Mariana Islands

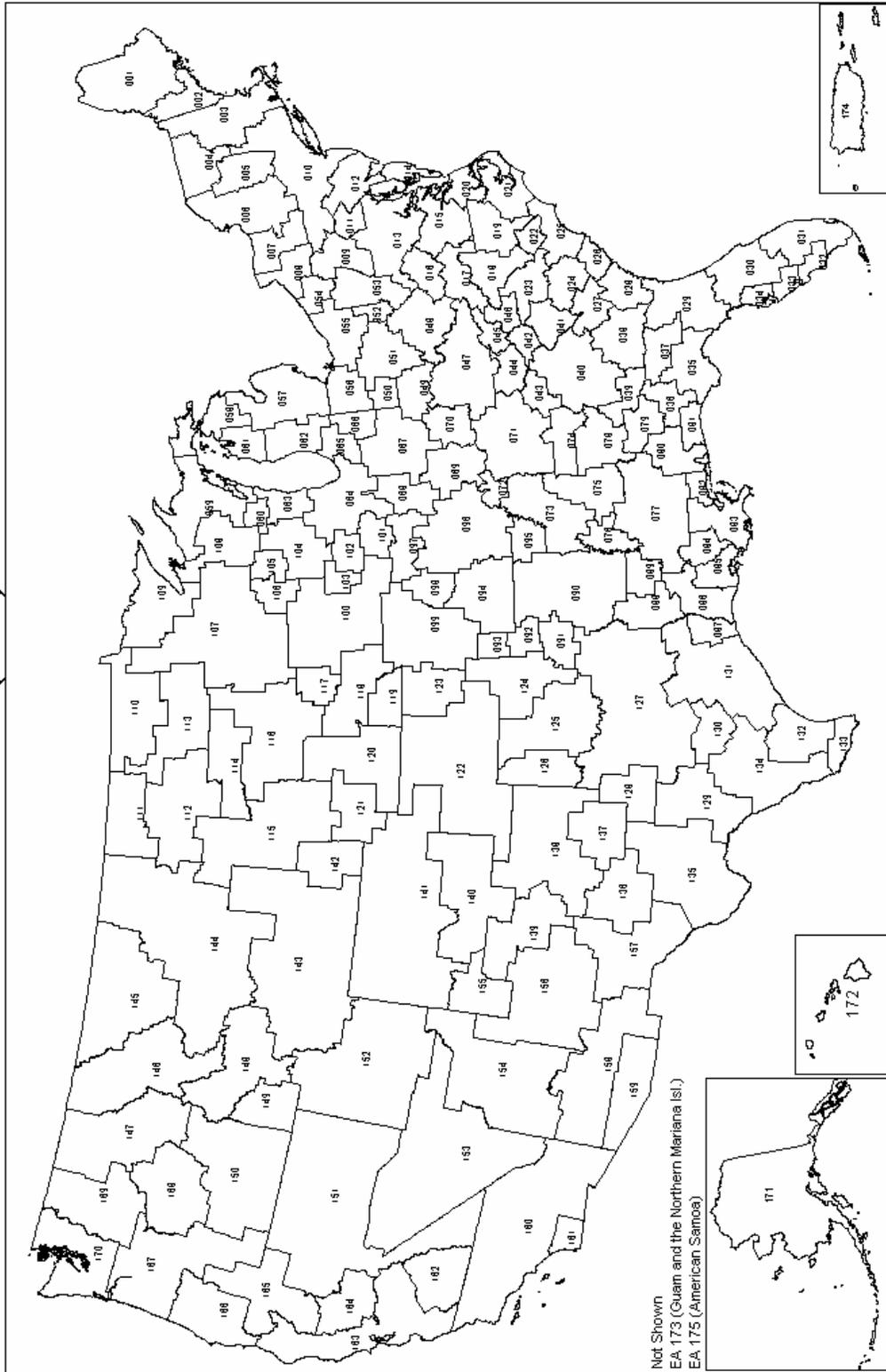
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pursuant to a license from Rand McNally &
Company through an arrangement with
The Personal Communications Industry
Association.

Map B-47



Map B-49

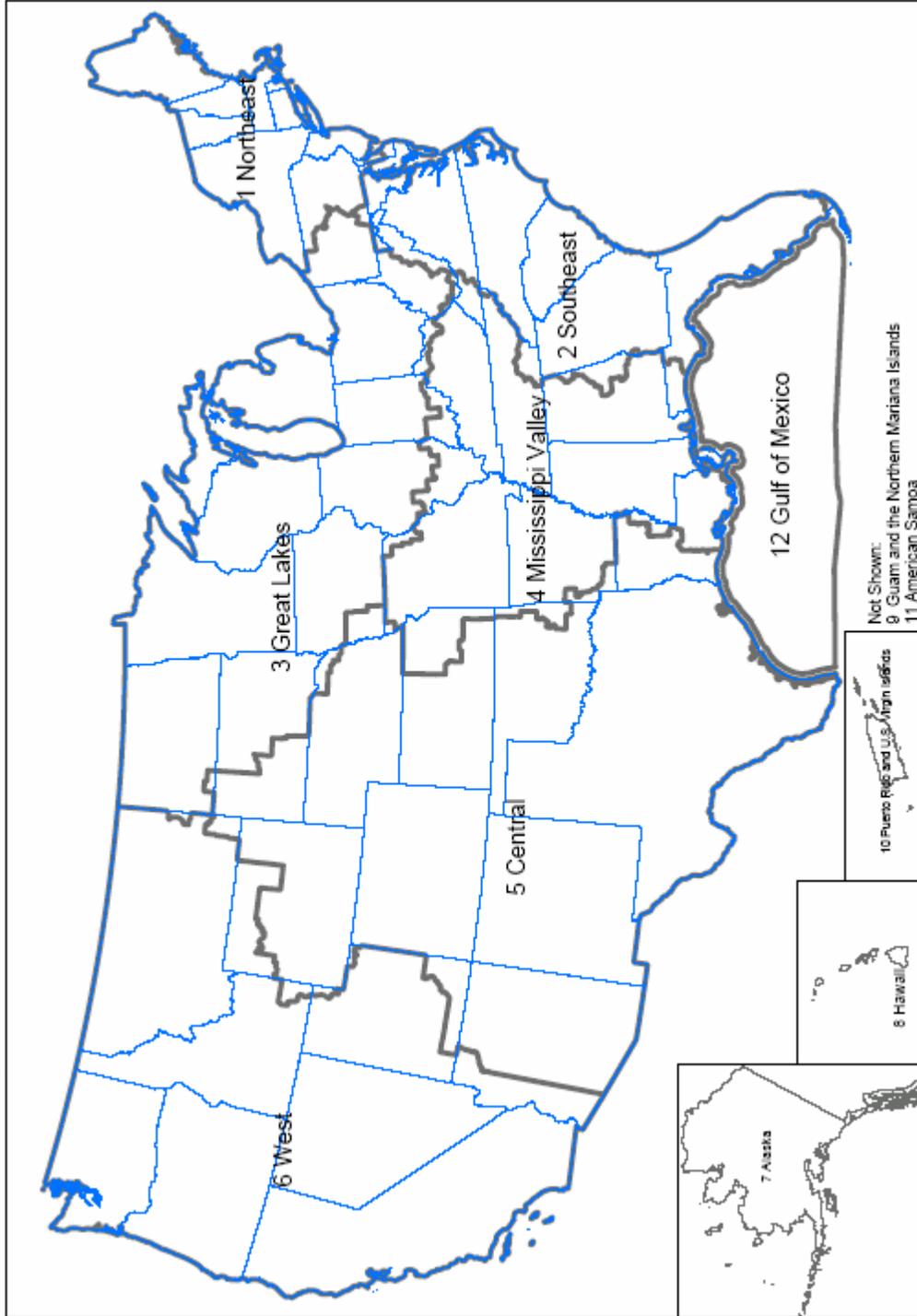
Economic Areas (EAs)



EAs delineated by the Regional Economic Analysis Division
Bureau of Economic Analysis, U.S. Department of Commerce
January 1995

Map B-50

Regional Economic Area Groupings (REAGs)



APPENDIX C**List of Commenters**Comments

3G Americas

CTIA – The Wireless Association

Globalstar

Inmarsat Ventures Limited

MetroPCS

Mobile Satellite Service Providers

Mobile Satellite Ventures Subsidiary LLC

National Telecommunications Cooperative Association (“NTCA”)

Satellite Industry Association

Sprint Nextel

TracFone

Replies to Comments

AT&T

Clearwire Corporation

Ericsson Inc.

SouthernLINC

TeleSpan Communications

T-Mobile USA, Inc.

Verizon

**STATEMENT OF
CHAIRMAN KEVIN J. MARTIN**

Re: Implementation of Section 6002(b) of the Omnibus Budget Reconciliation Act of 1993, Annual Report and Analysis of Competitive Market Conditions With Respect to Commercial Mobile Services, WT Docket No. 07-71

The Twelfth Annual Commercial Mobile Radio Service (CMRS) Competition Report demonstrates that the competitive marketplace for wireless services is continuing to bring consumers more choice, better services, and lower prices. Today's report introduces an additional data source that allows for a more granular and accurate analysis of mobile telephone service deployment and competition. This data provides detailed boundaries of the network coverage areas of every operational mobile telephone carrier in the United States based on census block, rather than counties as in previous reports. Because there are 8 million census blocks in the United States – versus only 3,200 counties – this allows for a significantly more accurate and granular assessment than previous reports.

Using this data, the Commission has been able to estimate that approximately 280 million people – or 99.8 percent of the total U.S. population – have one or more different operators offering mobile telephone service in the census blocks in which they live. Lower prices and innovative products have stimulated demand for mobile telephone services. At the end of 2006, there were 242 million mobile telephone subscribers in the United States, up from 213 million at the end of 2005, which translates into a nationwide penetration rate of 80 percent. The additional 29 million subscribers represent the largest absolute increase in the number of subscribers ever. Moreover, during 2006-2007, wireless providers continued to deploy broadband networks that allow typical downstream data transfer speeds of 400-800 kbps. As of May 2007, approximately 82 percent of the U.S. population lived in census blocks with at least one mobile broadband provider. In addition, as of December 31, 2006, 22 million mobile wireless devices capable of accessing the Internet at broadband speeds were in use in the United States, up from 3 million at the end of 2005.

Mobile telephone carriers are also making efforts to improve service quality and introduce new option for customers throughout the country. Since the release of our last report, I have been pleased to hear the announcement by carriers of their plans to introduce a new option that will allow customers to use any device and to use any applications that they choose on the carrier's network. As I noted when we adopted open network rules for the ongoing 700 MHz spectrum auction, wireless customers should be able to use the wireless device of their choice and download whatever software they want onto it. I continue to believe that more openness—at the network, device, and application level—helps foster innovation and enhances consumers' freedom and choice in purchasing wireless service. I am optimistic that these commitments along with the ongoing 700 MHz spectrum auction will ensure an exciting new era in wireless technology for the benefit of all consumers.

**STATEMENT OF
COMMISSIONER MICHAEL J. COPPS
APPROVING IN PART AND CONCURRING IN PART**

Re: Implementation of Section 6002(b) of the Omnibus Budget Reconciliation Act of 1993; Annual Report and Analysis of Competitive Market Conditions With Respect to Commercial Mobile Services, Twelfth Report, WT Docket No. 07-71

In past years, I have concurred in the agency's annual *CMRS Competition Report* because I believe it relied on insufficiently granular data and did not define the statutory term "effective competition." Today's *Report* makes important strides towards addressing my first concern. The analysis we release today relies upon census block data—not county-level data—gathered by an independent data provider. This more granular analysis yields quite a different picture of wireless availability in the U.S. than in past reports. We learn, for example, that only 25% of the U.S. land mass is covered by four or more wireless providers—not 49% (the figure generated by applying last year's methodology to this year's data).⁷⁴⁷ I greatly appreciate the willingness of Bureau Chief Fred Campbell, Division Chief John Branscome, and the Wireless Bureau staff to conduct this more accurate but also more difficult analysis. I know it took a lot of work, but the end result is a far more accurate and useful report than in previous years.

I nevertheless concur in part in this year's report because it still fails to define the term "effective competition." As I have stated before, we need to define that term ahead of time and *then* assess whether current competition data meets our definition. Instead, we come at the problem backwards—gathering some data throughout the year and, when report time rolls around, letting the data drive us to an undefined conclusion that competition is present. Not only does this *post hoc* process lack methodological rigor, it also leaves consumers, industry, and Congress with no clear idea of how this Commission will react to further changes in the market.

I find our failure to define "effective competition" especially striking because 2007 has been a year in which important concerns have bubbled to the surface about whether the current wireless marketplace delivers consumers an optimal mix of technologies, features, handsets, software, and services. Broad-ranging critiques about the openness of the cell phone market have come from academics, public interest advocates, wireless entrepreneurs, and columnists for the *New York Times* and *Wall Street Journal* covering technology.⁷⁴⁸ Concern over the lack of openness in the wireless industry even led a majority of this Commission to implement mandatory openness principles in 22 MHz of the 700 MHz spectrum the Commission will auction next year. While I would have preferred that we adopt a more expansive set of openness principles, I think it is quite significant that 2007 is the first year to see bipartisan recognition of significant barriers to innovation in the wireless marketplace.

⁷⁴⁷ Interestingly—and cause for some concern—the comparable figure from last year was 51%. This means that, with methodology held constant, at least one measure of wireless deployment in the U.S. has actually *decreased*. The difference (2%) is far from trivial—it represents 76,000 square miles, an area roughly the size of Nebraska or North Dakota.

⁷⁴⁸ See, e.g., Tim Wu, "Wireless Carterfone," *International Journal of Communication*, Vol. 1, p. 389, 2007; Testimony of Jason Devitt at Federal Communications Commission July 31, 2007 Open Meeting, available at <http://www.fcc.gov/realaudio/mt073107.ram> at 9 minutes 30 seconds; "Same name, very different phones," *Consumer Reports* (January 2008), at 38; David Pogue, "Are U.S. Cell Phone Carriers Calcified?" available at <http://pogue.blogs.nytimes.com/2007/07/05/are-us-cellphone-carriers-calcified/>; Walter Mossberg, "Free My Phone," available at <http://mossblog.allthingsd.com/20071021/free-my-phone/>.

I hope that in 2008 the agency can find bipartisan support for adopting an *a priori* definition of “effective competition.” In particular, I hope this definition can incorporate concepts like opportunity to innovate and measures of concentration in the handset and device software markets, along with more traditional concepts like market concentration at the carrier level. (I also incorporate my views from last year that a definition of effective competition must also account for the fact that two of the leading wireless companies are owned in whole or in part by wireline broadband providers.)

I am confident that questions about network openness will only grow in importance in 2008 and beyond, as wireless devices continue their transformation from mobile versions of the traditional telephone to smaller versions of laptop computers. The FCC must dedicate itself to policies that secure the same degree of hardware and software choice and innovation in the wireless market that we see in the market for personal computers and accessories. Of particular importance are the recent set of voluntary openness initiatives announced by carriers and their high-tech partners. Only time will tell whether these voluntary efforts yield concrete consumer benefits. I hope that the next edition of the *CMRS Competition Report* will take a serious and rigorous look at this set of issues.

**STATEMENT OF
COMMISSIONER DEBORAH TAYLOR TATE**

Re: Implementation of Section 6002(b) of the Omnibus Budget Reconciliation Act of 1993, Annual Report and Analysis of Competitive Market Conditions With Respect to Commercial Mobile Services, WT Docket No. 07-71

The Commission is required by Congress to produce an annual Commercial Mobile Radio Service (CMRS) Competition Report to monitor the development of competition in this important sector of the telecommunications market. This is the twelfth edition of this report, which for a dozen years has tracked the increasingly competitive nature of the mobile telephony market.

While the Commission's previous reports provided valuable information about the state of the CMRS market, this year's report is especially instructive. Analysis of the extent to which CMRS providers serve a particular geographic area has been improved to supply this information with a significantly greater degree of granularity. Whereas the Commission previously described the number of CMRS providers that served a county – even if they only served a portion of that county – the analysis offered here incorporates census blocks. In contrast to the approximately 3,200 counties in the U.S., there are over 8 million census blocks, the use of which offers a more localized perspective on where CMRS providers compete for customers. Thus, with this latest report, the Commission, Congress, and all other interested parties will have a much better understanding of the state of competition in the CMRS market.

Employing this more finely tuned data, the report finds that competition in the CMRS market in the U.S. is robust. Industry concentration remains low, and no single firm has a dominant market share. Over 95 percent of the U.S. population has access to three or more CMRS providers, and about 90 percent of the population has access to four or more providers. As a result of this competition, prices are very low – averaging seven cents a minute, about a third the level found in Europe. These low prices, in turn, benefit consumers, who have high rates of use – averaging over 700 minutes per month, among the highest of any country in the world.

But there is more than just price competition in the CMRS market. As in other U.S. industries, CMRS providers also compete on the quality of service they offer, as well as the variety of services they offer. Providers' voice and text-messaging services are well-established, and many are now expanding into data applications such as high-speed Internet access. An exciting new development is mobile video, which heralds the entrance of the much-anticipated third screen for video services. While we cannot know what will be the next new service or application in the market, the vigorous competition we see today will help ensure that future developments focus on the needs of consumers, not carriers.

In this competitive environment, Verizon Wireless has recently announced it will open its network at the device and application level in 2008. AT&T and other carriers have had unlocked – and also unsubsidized – handsets available for years, while Sprint Nextel and T-Mobile are working in partnerships such as the Open Handset Alliance to provide a greater variety of Internet-based applications, such as access to applications by Google. These actions are encouraging. They serve as a reminder that firms in a competitive market often will differentiate their goods and services to attract more and more consumers, from the tech-savvy to the tech-simple, by providing increasingly personalized service. This differentiation means much more than just competing on price; it also means offering the devices, applications, quality of service and type of network consumers demand.

Because consumers' preferences as well as technology continue to evolve, I am disappointed that this report does not say more about product and service differentiation as it relates to open access.

Instead, it highlights one policy established for a single band in the upcoming 700 MHz auction. Specifically, this report refers to the *700 MHz Second Report and Order*, in which the Commission found that the market for mobile telephony is “effectively competitive, and that competitive pressures continue to result in the introduction of innovative pricing plans and service offerings,”⁷⁴⁹ and then added that “(w)e have not found, however, that competition in the CMRS marketplace is ensuring that consumers drive handset and application choices, especially in the emerging wireless broadband market.”⁷⁵⁰ While it is true that the Commission has not determined that the market drives handset and applications choices, this is because the Commission has not fully examined the issue. Moreover, to the extent competition remains vigorous in the CMRS market, I believe the Commission should tread carefully when considering proposals for regulation. We should seek first to understand whether there is a market failure that justifies regulatory intervention.

Apart from these concerns, I commend this CMRS Competition Report. It is a very useful document, with page after page of facts, figures, charts, maps and, for the most part, helpful analysis. Most of all, this report is a testament to how the application of a light regulatory touch to a competitive market has resulted in one of the most innovative and vibrant sectors of the U.S. economy. The report also reflects many months of hard work by the Commission’s dedicated staff, whose efforts are greatly appreciated.

⁷⁴⁹ See Service Rules for the 698-746, 747-762 and 777-792 MHz Bands, WT Docket No. 06-150, Revision of the Commission's Rules to Ensure Compatibility with Enhanced 911 Emergency Calling Systems, CC Docket No. 94-102, Section 68.4(a) of the Commission's Rules Governing Hearing Aid-Compatible Telephones, WT Docket No. 01-309, Biennial Regulatory Review -- Amendment of Parts 1, 22, 24, 27, and 90 to Streamline and Harmonize Various Rules Affecting Wireless Radio Services, WT Docket 03-264, Former Nextel Communications, Inc. Upper 700 MHz Guard Band Licenses and Revisions to Part 27 of the Commission's Rules, WT Docket No. 06-169, Implementing a Nationwide, Broadband, Interoperable Public Safety Network in the 700 MHz Band, PS Docket No. 06-229, Development of Operational, Technical and Spectrum Requirements for Meeting Federal, State and Local Public Safety Communications Requirements Through the Year 2010, WT Docket No. 96-86, *Second Report and Order*, 22 FCC Red at 15362-63 ¶ 200 (2007) (“*700 MHz Second Report and Order*”).

⁷⁵⁰ *Id.*

**STATEMENT OF
COMMISSIONER ROBERT M. McDOWELL**

RE: Implementation of Section 6002(b) of the Omnibus Budget Reconciliation Act of 1993; Annual Report and Analysis of Competitive Market Conditions With Respect to Commercial Mobile Services, Twelfth Report, WT Docket No. 07-71

I am pleased that we have documented and are showcasing today the real and tangible consumer benefits that continue to flow from America's robustly competitive wireless industry. There is a great deal of good news here.

Our report shows that more than 95 percent of the U.S. population lives in areas with at least three mobile telephone operators competing to offer service, and more than half of the population lives in areas with at least five competing operators. More simply, the average American has a choice of at least five wireless carriers. Furthermore, no single competitor has a dominant share of the American marketplace. Concentration in the U.S. wireless market actually declined between 2005 and 2006. Just as exciting, the increase of 28.8 million U.S. wireless subscribers added during this same period represents the largest absolute yearly increase ever. Today, almost 250 million Americans are served by more than 150 wireless service providers.

Such explosive competition has yielded wonderful innovation – far beyond anyone's expectations. For example, during 2006 and 2007, wireless providers have continued to deploy mobile broadband networks. As of December 31, 2006, 21.9 million mobile wireless devices capable of accessing the Internet at broadband speeds were in use in the U.S. versus 3.1 million at the end of 2005. This represents a staggering 730 percent increase. Moreover, in the past year alone, the industry has launched MediaFLO live TV service, the Apple iPhone, and myriad location-based services that improve consumers' ability to find and purchase goods and services, and pinpoint their friends' whereabouts.

I have heard others cite the European and Asian wireless marketplaces as ones the U.S. should emulate. Consistent with last year's report, we again conclude that U.S. mobile subscribers lead the world in average voice usage by a wide margin. Western European subscribers average only 150 minutes per month and Japanese subscribers average 145 minutes per month, compared to an average of over 700 minutes per month in the U.S. We also conclude, yet again, that mobile calls are significantly less expensive on a per minute basis in the U.S. (about \$0.07) than in Western Europe (\$0.20 on average) and Japan (\$0.26). In addition, the percentage of mobile subscribers who use their mobile handsets to browse the Internet is slightly higher in the U.S. (10.7 percent) than in many Western European nations (less than 10 percent in Italy, Spain, France, and Germany). Finally, today's report concludes that the U.S. mobile penetration rate is now, for the first time, on par with those in Japan and part of Western Europe.

In fact, I am delighted that the international community has similarly taken notice of the benefits associated with the robust American mobile telephony market. In its own November 2007 report, THE INTERNATIONAL COMMUNICATIONS MARKET 2007, the United Kingdom's Office of Communications (OFCOM) notes the rise of mobile voice, growth of non-SMS mobile data services, and the emergence of mobile broadband across the international telecommunications markets. Like today's report, the OFCOM report also concludes that the U.S. has the least concentrated mobile marketplace, and concludes that the recent rapid growth in mobile subscriptions has put the U.S. ahead of Japan in terms of mobile concentration. In addition, OFCOM's report notes that Americans are the most satisfied with the speed of their broadband connections (85 percent), whereas Japanese consumers are the least satisfied (41 percent).

2006 also saw the continued increased availability of mobile handsets with Wi-Fi data service capability. Our report describes the efforts of two carriers who launched dual-mode cellular-Wi-Fi handsets designed to make voice calls on cellular GSM networks and at Wi-Fi hot spots (both at home and in public) using voice-over-Wi-Fi technology, with seamless handoff between the two types of networks. More recently, in early November 2007, the Open Handset Alliance introduced Android, a Linux-based software stack that consists of an operating system, middleware, a user interface and applications. The Android kit, which has been in development since 2006 and is expected to be released early next year, will allow software entrepreneurs to freely access the source code and customize applications for their individual purposes. Most recently, and after almost a year in the making, the two largest wireless carriers each announced initiatives to allow customers to use any wireless device and to employ elective applications on their respective networks.

Given the timing of all of these positive developments – which began sprouting in 2006 and even earlier – I question the assertion made by some that the government can claim credit for spurring device and application portability. Indeed, certain discussions set forth in this report appear to apply a shiny new gloss on the Commission’s very recent, and as yet untested, open access regulations in the 700 MHz spectrum band. I continue to be concerned that the Commission may have imposed an artificial ceiling that will hamper ongoing market-driven innovation and creativity. I also question the Commission’s unwillingness to admit that the wireless industry is (and has been) responding to consumer demand, not prospective regulatory fiat. In sum, I strongly caution against attempts to “spin” the data contained in this report into an *ex post facto* justification of regulatory mandates.